Medical Student Distress, Personal Health Care Practices and Barriers to Care

by

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Abstract

Medical students experience higher levels of psychological distress than age-matched peers. Suicide rates are also higher among medical students and physicians in comparison to the general population. Despite reported health needs, medical students are reluctant to seek help for mental health issues potentially resulting in inappropriate self-care practices and impairment. This trend increases throughout training and has been observed among physician populations manifesting as persistent, long-term mental health problems. Medical students report unique barriers to care which occur at individual, provider, and system levels and reflect issues related to stigma and the medical school culture or environment.

The aim of the current study was to determine the prevalence of psychological distress among a population of medical students in comparison to the general population, ascertain factors contributing to the distress, explore personal health care needs and practices, and identify barriers to care. A cross-sectional design was employed which involved administration of a survey. Participants included medical students in years one through four attending a university in Atlantic Canada. The prevalence of medical student distress in the current study was 17%. Medical students reported significantly higher levels of severe psychological distress (19%) than age-matched peers (5%) and yet were reluctant to seek help for mental health issues. Students also expressed concern they may develop mental health issues and/or inappropriate self-care practices over the course of their training. Students indicated a preference for informal consultation and off-site care, citing system-based barriers to care including concern for confidentiality, stigma, academic vulnerability and discomfort with the dual role of student-patient. Finally, students expressed reluctance to report impairment in a peer in scenarios depicting both high- and low-stigma consequences.

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Preface

This research is dedicated to all the medical students I have known in the 28 years I have worked in the Faculty of Medicine at Memorial University of Newfoundland. My interest in the topic of medical student distress resulted from my interactions with the medical students and my knowledge of the system and the resources available to them.

My first experience with a student in distress happened quite unexpectedly when a student entered my office one day just for a moment to pause. Few words were spoken, tissues were exchanged, and the student left as quickly as they had come. I was a little taken aback but mostly concerned for the student's well-being. I was known to the students as I coordinated the Community Health curriculum and their first year rural rotations, but it was more than that. While I work in the faculty, I am physically removed from the core administrative offices and largely involved in the curriculum and not matters of student administration or wellness. I can only assume the student was in search of a place that did not pose a threat, was not associated with administration, and was not under the watchful eyes of other students. Regardless of the reason, this was not the last student to visit my office. Since that time, I have mediated numerous confidential referrals off-site under the advisement of Student Affairs.

I had some time to ponder the matter further over the Christmas holidays that year and wondered if the problem was unique to our medical school, or if it was widespread. A search of the literature quickly revealed the phenomenon was not unique to our medical school. I resolved to investigate further the first opportunity I had. This opportunity came in the form of a pilot project on barriers to mental health care among first year medical students for an undergraduate psychology course I was completing. The initial results were consistent with the literature and indicated reluctance on the part of the medical students to seek help for mental health issues.

The next opportunity came in the form of my current research project for my Master's in Community Health.

It is my hope that by doing this research where I have worked and interacted with students and faculty alike, that I may make some small contribution to the well-being of our medical students, by exposing some of the issues in the medical school environment and curriculum, and the negative impact of the hidden and informal curriculum, to inspire change in some of the traditional, cultural practices in the training of our medical students and promote the health and well-being of our future healers.

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List of Abbreviations

AUC……Area Under the Curve

BDI……..……..Beck Depression Inventory

CCHS……..Canadian Community Health Survey

CES-D…….Center for Epidemiologic Studies-Depression Scale

DSM-IV…….……Diagnostic and Statistical Manual of Mental Disorders, 4th Edition

K10…….…… Kessler Psychological Distress Scale

LCME……...……..Liaison Committee on Medical Education

PMSS……...Perceived Medical School Stress Scale

PPV……..…….Positive Predictive Value

MSHS……..Medical Student Health Survey

NPS……..……..Non-Prescription Stimulant

NPV…….……Negative Predictive Value

PRIME-MD…….….……Primary Care Evaluation of Mental Disorders

ROC…….Receiver Operating Curve

SCL-90……Symptom Check List 90

UNM-SOM……...…University of the New Mexico School of Medicine

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Chapter 1: Introduction

This study aims to explore the prevalence of psychological distress, potential contributing factors, personal health care needs and practices, and barriers to mental health care among a population of medical students in the Faculty of Medicine, at a university in Atlantic Canada. The thesis will include a summary of the problem, proposed research objectives, and a review of the literature. It will also summarize the research methods including a description of the sample, measures and procedures, a plan for data analysis, and the results. Implications for change will be discussed in terms of the current culture of care and practice in medical school and in the profession in general, as well as future directions for research.

Problem

Medical students experience higher levels of depression, anxiety and general psychological distress than age-matched peers in the general population (Dyrbe, Thomas, & Shanafelt, 2006). Despite reported health needs, medical students are reluctant to seek help for mental health issues (Givens & Tjia, 2002; Roberts, Hardee, Franchini, Stidley, & Siegler, 1996; Roberts et al., 2000a) which can result in inappropriate self-care practices such as self-diagnoses and treatment, self-medication, and substance use, which has the potential to lead to impairment (Hughes, Conard, Baldwin, Storr & Sheehan, 1991; Kay, Mitchell, Clavarino, & Doust, 2008; Dyrbe et al., 2006; Schwenk, Davis, & Wimsatt, 2010). This is a trend which increases throughout medical school (Dyrbe, Thomas, & Shanafelt, 2005; Roberts et al., 2000b; Thompson, Cupples, Sibbett, Skan, & Bradley, 2001) potentially resulting in persistent, long-term mental health problems in practicing physicians (Center et al., 2003; Greenup, 2008; Kay et al., 2008; Norris, Elliott, &Tan, 2010; Worley, 2008; Thompson et al., 2001). Impairment as it applies to physicians or medical students refers to "any physical, mental or behavioural disorder

that interferes with the ability to engage safely in professional activities" (American Medical Association, 1973). Suicide rates are higher among medical students and physicians in comparison to age-matched peers in the general population (Dyrbye et al., 2008; Frank, Biola, & Bunrett, 2000; Moutier et al., 2012; Schernhammer & Colditz, 2004) reflecting the undertreatment of mental health issues among medical students and practising physicians (Center et al., 2003; Givens & Tjia, 2002; Schwenk et al., 2010; Tyssen, Vaglum, Gronvold, & Ekeberg, 2001).

Factors which contribute to medical student distress include academic pressures, social issues, the medical school environment, and financial concerns (Center et al., 2003, Dyrbe et al. 2006; Hooper, Meakin, & Jones, 2005; Vitaliano, Russo, Carr, & Heerwagen, 1984; Vitaliano, Maiuro, Mitchell, & Russo, 1989). Medical students report unique barriers to care which occur at individual, provider, and system-based levels and reflect issues related to stigma, the medical school environment, and the informal and hidden curriculum (Brimstone, Thistlethwaite, & Quirk, 2007; Center et al., 2003; Dyrbe et al., 2015; Hafferty, 1998; Hooper et al., 2005; Roberts et al., 1996, 2000a; Tjia, Givens, & Shea, 2005). The informal curriculum refers to the informal interactions between teachers and learners, whereas the hidden curriculum pertains more to the organizational structure and culture of medicine (Hafferty, 1998).

Medical school has traditionally been described as a breeding ground for stigma and discrimination in relation to mental illness (Goffman, 1963; Thornicroft, Rose, & Mehta, 2010). Stigma is a broad term used to describe a lack of knowledge, negative attitudes or prejudice, and discriminatory practice. Stigma was first defined as “an attribute that is deeply discrediting” whereby an individual is diminished “from a whole and usual person to a tainted, discounted one” (Goffman, 1963; p. 3). A more recent definition of stigma describes it as “any attribute,

trait, or disorder that marks an individual as being unacceptably different from the 'normal' people with whom he or she routinely interacts, and elicits some form of community sanction" (Scambler, 1998; p. 1054). Stigma is a multi-dimensional phenomenon which encompasses both public- and self-stigma. Public stigma describes the extent to which the public engages in negative stereotypes and discrimination toward mental illness, whereas self-stigma refers more to how an individual internalizes, enacts, and embodies experiences of stigma (Corrigan, 2004).

Medical education has contributed little to deconstructing the stigma associated with the mentally ill medical student or physician (Ay, Save, & Fidanoglu, 2008) and can contribute to students' perceptions of stigma by way of the hidden curriculum (Dyrbye et al., 2015). Hafferty (1998) describes medical education as being comprised of various dimensions some of which exist outside the formally taught curriculum. These dimensions represent three overlapping areas or 'spheres of influence'; namely: the stated, intended and formally offered and endorsed curriculum (formal curriculum); the unscripted, interpersonal form of and learning that occurs in the interactions among and between faculty and students (informal curriculum); and finally, the set of influences that function at the level of organizational structure and culture (hidden curriculum).

The perception by medical students and physicians that they need to maintain an image of health coupled with their discomfort in the patient role and concerns for confidentiality, contribute to poor help-seeking practices, inappropriate self-care practices and unsupervised or unmonitored self-prescribing of medication (Montgomery et al., 2011; Roberts et al., 1996, 2000a). Current attitudes, policies, licensing and insurance practices pertaining to mental health care for health professionals, penalize physicians and medical students who do seek help. A study which examined residency matches, for example, found that opportunities for residents

were reduced if they had a history of psychological counselling (Oppenheimer, Miller, & Forney, 1987). Further to these findings, punitive practices directed toward physicians with psychiatric disorders include discrimination in medical licensing, health and malpractice insurance, hospital privileges, and professional advancement (Centre et al., 2003).

The impact of punitive measures on medical students and physicians and the stigma of mental health issues in medicine reinforce the silence among medical students creating an additional barrier to seeking care. Such an approach toward mental health care and health professionals requiring care, perpetuates the unrealistic belief that physicians and students must be strong and self-reliant, promotes and reinforces inappropriate self-care practices, and contributes to physician and student impairment increasing their risk for harm (Center et al., 2003; Myers & Fine, 2003; Roberts et al., 2001, 2005; Yiu, 2005;). Consequences of delayed help-seeking and inappropriate self-care practices contribute to impairment, suicidal ideation, and suicide among medical students and physicians (Center et al., 2003; Dyrbe et al., 2006; Givens & Tjia, 2002; Kay et al., 2008; Roberts et al., 1996, 2000a; Schwenk et al., 2010; Thompson et al., 2001).

Purpose and Objectives

The purpose of the current research study was to assist in addressing the current gap in the Canadian literature in terms of the prevalence of psychological distress among Canadian medical students as compared with age-matched peers in the general population using the Canadian Community Health Survey data (CCHS 1.2; Statistics Canada, 2012). Furthermore, the study aimed to assess perceived medical school stress and identify contributing factors, explore the health care needs and personal health care practices of medical students, and identify

potential barriers to care. There are five main objectives of this research study:

1. To determine the prevalence of psychological distress among a cross-sectional sample of medical students and compare levels of distress with age-matched peers in the general population;
2. To compare levels of psychological stress across various levels of training among a sample of medical students;
3. To assess and compare perceived medical school stress and identify factors which may contribute to distress at various levels of training among a sample of medical students;
4. To explore the personal health care needs of a sample of medical students
5. To explore the personal health care practices of a sample of medical students; and identify potential barriers to care.

Rationale

Understanding the prevalence and potential causes of psychological distress among medical students as well as their health care needs, practices, and system-based barriers to care is critical to the development of strategies to reduce or prevent impairment and to promote well-being in our medical students and future physicians. The findings from this study have important implications for practice and policy related to curriculum-based and service-based programs in Canadian medical schools to address the stigma related to issues of mental health among health professionals, the informal and hidden curriculum in our medical schools, and the resulting barriers experienced by medical students in need of mental health care.

Chapter 2: Literature Review

Prevalence of medical student distress

The prevalence of psychological distress (e.g. stress, anxiety, burnout, and depression) and other related mental health problems among medical students is higher than age-matched peers in the population and ranges from 12-25% (Dyrbe et al., 2006), including 7-18% who suffer from substance use disorders (Hughes et al., 1991). In terms of the types of distress experienced, 12-24% of medical students suffer from depression (Givens & Tjia, 2002), 21 % report moderate psychological distress including anxiety (Henning, Ey, & Shaw, 1998), and 25% report poor global mental health (Toews et al., 1997). In comparison, among adults in the general population, approximately 11-13% experience symptoms of mild psychological distress and 1 in 4 patients seen in a physician's office will report symptoms of mild psychological distress (Kessler et al., 2003).

Stress.

Stress in medical school is a widely acknowledged and researched phenomenon. Findings from a nationally representative sample of 2,316 medical students in the United States (Compton, Carrera, & Frank, 2008) revealed that 18-26% of medical students reported high levels of stress, 40% reported moderate stress, and 24-29% reported mild psychological distress at the time of survey administration. In relation to levels of stress over the past year, 45-53% reported moderate stress, while 47% of students entering clerkship reported high levels of stress in comparison with only 20% of first year students. Similarly, a study conducted at the School of Medicine in San Antonio, Texas (Chang, Eddins-Folensbee, & Coverdale, 2012) found that 40% of students reported high levels of stress, with levels increasing from years one through three. These US studies demonstrate a trend in increasing psychological distress as students

advance through medical school training and highlight the need for similar research in Canadian medical schools.

Anxiety.

Medical students also experience high levels of anxiety in relation to academic performance, examinations and evaluation, heavy workloads, time pressures, self-expectations, and the competitive nature of medical school (Dyrbe et al., 2006). In a study by Vitaliano et al. (1989) which examined anxiety experiences of medical students, 25% of medical students had scores on the Symptom Check List 90 (SCL-90) above the 99th percentile of non-patient norms for anxiety, while 34% of medical students had anxiety scores higher than the mean score for outpatient psychiatric patients. A study by Toews, Lockyer, Dobson and Brownell (1993) demonstrated that medical students had greater anxiety subscale scores on the SCL-90 than residents and age-matched peers in the general population. Numerous other studies have demonstrated that high levels of anxiety and stress among medical students can negatively impact health-related behaviours and promote risk-related behaviours such as substance use, alcohol abuse, and other maladaptive coping strategies in an attempt to reduce stress (Button, 2014; Dyrbe et al., 2006; Hughes et al., 1991).

Burnout.

Burnout, a term commonly used to describe a specific type of medical student and physician distress, has been defined as a measure of professional distress that includes three dimensions: emotional exhaustion, depersonalization, and loss of sense of personal achievement. Emotional exhaustion is characterized by feeling emotionally drained from one's work or studies. Depersonalization reflects students' treatment of people or patients as though they are objects. Low personal accomplishment is reflected in feeling that one's work is not important

(Drybe et al., 2006). The prevalence of burnout among medical students and residents has been reported to range from 30-80% (Shanafelt, Bradley, Wipf, & Back, 2002; Thomas, 2004).

A multicenter study conducted by Dyrbe et al. (2006) found that more than 45% of medical students reported experiencing burnout with quality of life scores lower than the national sample of age-matched peers, suggesting that physician burnout and low-life satisfaction originates in medical school. Similarly, a systematic review of the literature by Ishak et al. (2009) found a prevalence of 28%-45% among medical students and between 27%-75% among residents. Distress among medical students can lead to burnout which in turn contributes to deterioration in physical and mental health, drug abuse, relationship difficulties, and other social problems, as well as impairment in job performance, patient safety and overall poor morale (Dyrbe et al., 2006; IsHak et al., 2009; Maslach, Jackson, & Leiter, 1996). Both burnout and depression are associated with impairment and suicidal ideation and behaviour among medical students and physicians (Dyrbye et al., 2008).

Depression.

In terms of the prevalence of depression, a study by Givens and Tjia (2002) found that 24% of medical students reported they were depressed as assessed by the Beck Depression Inventory (BDI) yet only 22% of the depressed students had reported accessing mental health services. A more recent study by Tija et al. (2005) indicated that only 26.5% of depressed students received treatment. The results of both these studies highlight the under treatment of mental health issues among medical students. A study by Rosal et al. (1997) found that the prevalence of depression or depressive symptomology increases over the course of medical school. These findings suggest that psychological distress is chronic and persistent throughout medical school training and is likely not episodic in nature. Similarly, a study by Dyrbe et al.

(2006) found a peak in depression rates during the second year of medical school. Further, Compton et al. (2008) found that self-reported depressive symptomology, in a nationally representative sample of 2,316 medical students in the United States, increased as students began their clerkship training with a transition from the classroom to patient care on the units. Finally, a multisite study of residents conducted by Goebert et al. (2009) examined rates of depression using the Center for Epidemiologic Studies-Depression Scale (CES-D) and the Primary Care Evaluation of Mental Disorders (PRIME-MD) as well as rates of suicidal ideation. Findings from this study revealed that 12% of residents met the criteria for major depression, 9.2% met the criteria for mild-moderate depression, while nearly 6% reported suicidal ideation, highlighting the importance of identifying mental health problems early, providing timely and appropriate treatment, and ongoing mental health education in medical school.

Substance use.

Substance use involving both alcohol and prescription, and non-prescription medications are higher among medical students and physicians than among, similar age-matched peers (Hughes et al., 1991). Substance use is a common self-care response to mental health distress among medical students and physicians, particularly as there are fewer barriers in terms of accessing medications (Dyrbe et al., 2006). In a study by Shah, Bazargan-Hejazi, Lindstrom, and Wolf (2009), which examined alcohol use among 2,710 medical students from across 36 U.S. medical schools, 15% of students demonstrated at-risk drinking behaviour. A study conducted at one medical school in the U.S. found that 84% of students reported drinking in the past month, while 38% reported excessive or binge drinking. Current literature also suggests that year of training may be associated with higher rates of drinking (Ball & Bax, 2002; Shah et al., 2009) due to the types of stressors specific to various stages of training. Changes in academic

pressures, workload, and the frequency of burnout experienced by clerks in the clinical years were common stressors identified by students (Sarikaya, Civaner, & Kalaca, 2006).

In terms of non-prescription stimulant (NPS) use, Tuttle, Scheurich, and Ranseen (2010) found a 10% lifetime prevalence of NPS use among medical students and 5% prevalence was found during medical school. The prevalence of marijuana use was lower than the general population and lower than NPS use at 1%. Another study by Choi, Tolva, Socha, and Samenow (2013), sought to examine how specific substance use behaviours, such as NPS use, among U.S. medical students contributed to attitudes or beliefs around professionalism. A particularly critical finding from this study was that NPS users were most at-risk for suicidal ideation (Choi et al., 2013). Self-medication rates among medical residents ranged from 61% to as high as 92% for having prescribed medication at least once (Wachtel, Wilcox, Moulton, Tammaro, & Stein 1995; Uallachain, 2007). In 76% of the 27 studies reviewed, only 56% of students or physicians identified having a primary care physician (Montgomery, Bradley, Rochfort, & Panagopoulou, 2011). In terms of commonly prescribed medications, Hughes, Brandenburg and Baldwin (1992) found that one in nine physicians used benzodiazepines and one in six self-prescribed opiates without the supervision of another physician. A study by Schneider, Bouvier, Gallacchi, Goehring, Kunzi, and Bovier (2007) on self-medication use highlighted more frequent use of analgesics (96%) and tranquilizers (96%) compared to antidepressants (70%) or antihypertensive drugs (65%). A study by Shadbolt (2002) which examined residents in training, reported self-prescription practices which included antibiotics (81%), sleeping pills (38%), antihypertensive (15%), antidepressants (7%), and narcotic analgesics (7%). In general, physicians and medical students endorse self-treatment for acute and chronic conditions because informal care is an accepted practice in the medical profession. Increases in self-medication also come with higher

levels of training when students have increased capacity to write their own prescriptions (Montgomery et al., 2011).

Suicidal ideation and suicide.

Suicide may be on the extreme end of the personal distress continuum; however, high levels of mental distress coupled with inappropriate self-care practices and substance use increases the risk of suicide in medical students and physicians. Suicidal ideation, a risk factor for suicide, is reportedly higher among medical students than the general population. Between 11.2% and 14% of medical students across 7 medical schools in the United States reported suicidal thoughts (Dyrbye et al., 2008). The lifetime prevalence of suicidal ideation among medical students has been reported as high as 43%; 8% having planned a suicide and 1.4% attempting suicide (Tyssen et al., 2001). In the same study, suicidal ideation was predicted by perceived lack of control, personality traits such as neuroticism, being single, negative life events and mental distress (Tyssen et al., 2001a). Further, a study by Tjia et al. (2005) conducted at a single medical school in the United States found that 15% of students were classified as depressed, as assessed by the Beck Depression Inventory (BDI), while 20% reported experiencing suicidal ideation during medical school; however, only 26.5% of depressed students reported receiving treatment.

Suicide rates are also higher among medical students and physicians in comparison to age-matched peers in the general population, although prevalence rates have been difficult to establish (Moutier et al., 2012). It is estimated that approximately 300 to 400 medical students and physicians in the US commit suicide each year (American Foundation for Suicide Prevention, 2011; Moutier et al., 2012). A national study conducted in the United States in 2000 on causes of death, demonstrated a 70% higher rate of mortality from suicide and self-inflicted

injuries among white, male physicians compared with any other professional. A meta-analysis of studies which examined physician suicide in the US revealed a relative risk of 1.41 for males and a relative risk of 2.27 for females (Schernhammer & Colditz, 2004). The suicide rate for female physicians exceeded that of the general population by three to four times (Frank et al., 2000). The risk of suicide is further exacerbated by the undertreatment of depression and other psychiatric disorders in medical school (Center et al., 2003; Schwenk et al., 2010; Tyssen, Vaglum, Gronvold, & Ekeberg, 2001). These findings and the limited research conducted in Canada highlight the importance of assessing the prevalence of psychological distress among Canadian medical students.

Factors Related to Medical Student Distress

The high prevalence of psychological distress among medical students demonstrates the importance of identifying potential factors which may contribute to distress among this population. Early research on medical student distress identified both external or environmental stressors, including adjustment to the medical school environment, and internal stressors pertaining to the intolerance of uncertainty. Internal stressors also included perceptions of personal adequacy or competence, limitations in medical knowledge, and uncertainty related to students being able to distinguish between incompetence or their limitations in medical knowledge (Benbassat, Baumal,Chan, & Nirel, 2011). Vitaliano et al. (1984) identified three basic sources of perceived stress: academic pressures, social issues, and financial concerns. Medical school experiences identified as sources of distress among students included: perceived threat from the medical school, mastery of medical knowledge, lack of anonymity, restrictions on time for personal activities, peer competition and the ability to endure long hours of work (Vitaliano et al., 1984). Additional studies have further highlighted the importance of

understanding the medical school environment, the informal and hidden curriculum, how students navigate the process of enculturation into medicine, personal characteristics of students, and a combination of these factors as sources of stress (Center et al., 2003, Dyrbe et al. 2005; Hafferty, 1998; Hooper et al., 2005, Vitaliano et al., 1989).

Medical students have described the medical school environment as cold, impersonal, isolating, intimidating, and competitive at the cost of humanism and compassion (Baret, 2011; Vitaliano, 1984). The enculturation process of medical students has also been reported to be highly stressful, anxiety-provoking, and traumatizing for some students (Pitkala & Mantyranta, 2003). Further, the professional socialization of medical students to the role of physician can have a profound influence on the values, attitudes, and normative behaviours students adopt throughout their training which can also impact their well-being (Pitkala & Mantyranta, 2003; Shuval, 1975). Students acquire these values, attitudes and behaviours through the informal and hidden curriculum (Hafferty, 1998; Lempp & Seale, 2004; Mahood, 2011).

A longitudinal study conducted by Vitaliano et al. (1989) of perceived medical student stress examined indices of distress across level or year of training using the previously developed Perceived Medical School Stress Scale (PMSS; Vitalianio et al., 1984). Findings from the longitudinal study demonstrated that among groups that began medical school with high levels of perceived stress, increases in anxiety were significantly related to perceptions of peer competition, the inability to master the pool of medical knowledge, and medical school's control over one's life. Increases in depression were significantly related to increases in perceptions of peer competition and threat from medical school. For groups that tested low on the PMSS initially, increases in anxiety were significantly related to increases in perceptions about threat from the medical school, inability to master the pool of medical knowledge, and the inability to

endure long hours. Increases in depression were significantly related to increases in perceptions about the inability to endure long hours, threat from medical school, medical school's control over one's life and peer competition. These constructs can be categorized under three main areas assessed by the PMSS: medical school curriculum and environment, personal competence and endurance, and social/recreational life. The findings from these studies highlight the potentially negative impact of stress and anxiety on cognitive function and performance which is contrary to traditional, cultural beliefs in medicine that stressful experiences are necessary to the training of medical students to prepare them for future medical practice (Vitaliano et al., 1984, 1989).

A review of the literature by Seritan, Hunt, Shy, Rea and Worley (2012) expanded on the previously noted sources of stress and organized them into two broad categories; namely individual and environmental factors. Individual factors include both intrapersonal factors (previous mental health issues, academic difficulties, learning difficulties, poor study habits, lack of time-management), emotional-intelligence deficits (lack of self-awareness, self-management, limited social awareness, poor relationship management, and personality factors), and interpersonal factors (personal life events, work-life balance, family illness, financial stress, family demands/ expectations). Environmental factors reflect the learning environment and refer to the institutional processes and practices that comprise medical training and culture. These factors include interactions with peers, supervisors and administration (faculty, students, staff, and other health professionals), exposure to human suffering through interactions with patients and their families, demanding workloads with unrealistically high expectations for student performance, encounters with the hierarchical culture of medicine including student mistreatment and abuse, neglect of important social supports, stigma associated with mental illness, and cultural insensitivity.

A systematic review of medical student psychological distress, causes and consequences by Dyrbe et al. (2006) highlighted both personal factors (life events, personality, coping strategies, personal responsibilities, financial debt, learning style, motivation) and system factors related to medical school training (academic workload, curriculum, system of performance evaluation, exposure to patient suffering, financial student debt, student mistreatment/abuse, institutional culture, hidden/informal curriculum, ethical conflicts). Most research has focussed on the medical school training experience; however, personal life events also contribute to distress in this population. Loss of a family member or loved one, personal illness or injury, and illness in a family member are all sources of distress for medical students as they are in the general population. Restricted time for social life due to inflexible schedules and regular examinations exacerbates this distress for medical students. In terms of medical school training, adjustment to the medical school environment and the transition from lay person to medical student represents the first major, stressful transition for medical students. The transition is characterized by a demanding workload, concern for academic performance, peer competition and high-stake exams. Clinical training represents the next stressful transition for medical students (Dyrbe et al., 2005; Radcliffe & Lester, 2003; Rosal et al., 1997). Clinical clerks are separated from their classmates and social support networks for the first time, and rotating through new learning environments which command different knowledge bases and skill sets that often highlight their inadequacies and inability to master the pool of medical knowledge. The less formally structured learning environment (hidden curriculum), lack of time for a social life or recreation, long shifts, and students' perceptions of their own competence act as additional stressors which contribute to high levels of psychological distress in this population.

Dahlin, Joneborg, and Runeson (2005) examined different stressors and depression among 342 Swedish medical students at various levels of training. The PMSS was employed to assess student stress experiences at the beginning and again at the end of their medical school training. The best predictors of stress and depression found among first year students were academic workload, lack of faculty feedback, and performance evaluation. Students from first year through third year, in comparison to fourth year students, indicated that medical studies controlled their life leaving limited time for other activities. Among third year students, worries about future endurance and competence as well as curriculum shortcomings were identified as key stressors. Residents were more negatively impacted by their perceptions of a non-supportive environment and insufficient feedback from physician supervisors.

A national, longitudinal study conducted in Norway by Midtgaard et al. (2008) examined the occurrence and predictors of medical student mental health problems requiring treatment. Mental health problems identified during the first three years of medical school were best predicted by previous mental health problems, personality traits (vulnerability, intensity, control, and reality weakness), medical school stress, and negative life events. Reality weakness is a term coined by Tyssen, Ole Røvik, Vaglum, Grønvold and Ekeberg (2004) to describe a personality trait which has been shown to predict emotional problems in medical students and young doctors. It is described as experiencing oneself as being totally different at different points in time (feeling like being in a fog) and has been linked to chronic delusions, paranoid traits, and problems with relationships. Reality weakness was also found to predict physicians who do not seek help. Medical school stress was assessed using an adapted version of the PMSS (Vitaliano et al., 1984) and included factors specific to the medical school environment such as feelings of anonymity, isolation, controlling one's life, restrictions on time for other activities,

and concern about mastering the amount of medical knowledge. Similar to the findings from Vitaliano et al. (1984), predictors tapped into three key areas: medical school environment, personal competence and endurance, and social/recreational life. Perceived medical school stress was a significant predictor of mental health problems requiring treatment.

A previous study conducted by Tyssen et al. (2001) found that high scores on the PMSS at the end of medical school training predicted mental health problems requiring treatment in postgraduate students four years later. The findings from these studies highlight high levels of emotional distress among medical students early in their training related to both systemic and personal factors which were severe enough to require treatment, and which worsen throughout medical school training, yet many do not seek treatment.

Health Care Needs or Wants, Concerns, and Practices

The majority of medical students report needing or wanting health care at some point during medical school (Roberts et al., 2000a). Commonly reported health needs and practices include needing or wanting care as it pertains to health maintenance, immunizations, cold or flu symptoms, fatigue, stress, infections, headaches, anxiety, gastrointestinal complaints, injury, depression, pain, and problems eating. Compared other student populations, medical students may have more insight into their health issues, and report significant rates of physical and mental health symptoms (Givens & Tjia, 2002; Roberts et al., 1996, 2000a).

Personal health care practices of medical students reflect their reluctance to seek formal help for mental health issues. Studies which have examined health care needs and rates of help-seeking among medical students found that between 57-74% of students suffering from a mental health issue do not seek help (Leao, Martins, Menezes, & Bellodi, 2011; Givens et al., 2002; Midtgaard et al., 2008; Roberts et al., 1996, 2000a; Tjia & Givens, 2005). A nationally

representative survey of US medical student's personal health-related practices, conducted by Frank, Carrera, Elon and Hertzberg (2006) also demonstrated overall poor personal screening practices. For example, the proportion of students visiting a family physician for a check-up in the past year ranged from 25% of senior male students and 54% of senior female students, and 64% of males and 75% of females at orientation in first year when expected to have had a physical examination. The rate of visiting a family physician was much lower among senior students (25-54%) than age-matched peers in the general population (68%) and medical students in their first year of studies. A nationwide study in Norway conducted by Midtgaard et al. (2008) examined mental health issues requiring treatment and help-seeking behaviours of medical students. Findings from this study demonstrated that 33% of medical students reported mental health problems in need of treatment during the first 3 years, yet more than 50% of those students did not seek help. The reasons reported for their reluctance to seek help for mental health issues were consistent with other findings in the literature; namely, fear of stigma attached to psychiatric treatment or diagnoses, academic vulnerability, and lack of confidentiality.

A pilot study of medical student health care needs, practices, and concerns conducted by Roberts et al. (1996) found that the majority of students reported having both mental and physical health care needs (91% females; 81% males); 22% indicated a preference for informal consultation, including prescriptions from peers, attending physician, or resident; 55% did not seek care due to time constraints; 43% self-diagnosed or determined the problem would go away; 12% were concerned with confidentiality and 25% experienced difficulty obtaining care. In terms of help-seeking concerns, 35% perceived academic jeopardy in relation to seeking care for stigmatizing illnesses such as mental illness or HIV; 59% perceived career jeopardy in relation to seeking help for substance use, and 18% perceived academic jeopardy related to having

depression or stress symptoms. When presented with various health-related scenarios or vignettes pertaining to medical students adopting the role of patient, ranging from seeking help for common or stigmatizing conditions, the majority of students (47%-78%) indicated they would not proceed with the dual role of medical student-patient. In addition, in scenarios which depicted impaired colleagues or fellow students, 80% of students responded that they would not report a seriously ill or impaired student to administration. A follow up study to the pilot referenced above conducted by Roberts et al. (2000a) with 1,027 medical students at multiple sites also found that the majority of students reported needing both mental and physical health care (90%) yet 57% of those students did not seek care. Similarly, students were concerned with schedule constraints (37%), confidentiality (15%), difficulty obtaining care (48%), and instead chose to seek informal care from colleagues (15%), particularly for potentially stigmatizing health concerns.

In terms of help-seeking practices, medical students are more likely to report a preference for informal care from friends or family and off-record consultation with fellow students, including requesting prescriptions (Roberts et al., 1996, 2001). The practice of informal consultation adopted by medical students early in their training has been shown to increase throughout clinical training (Dunn, Moutier, Hammond, Lehrmann, & Roberts, 2008; Givens et al., 2002; Hooper, Meakin, & Jones, 2005; Roberts et al., 2000a). A qualitative study by Chew-Graham, Rogers, & Yassin (2003), found that medical students not only preferred to seek help for mental health issues from family and friends versus institutional services, but also preferred to seek help for these issues from medical school friends versus friends outside medical school. Brimstone et al. (2006) examined medical student self-care practices and found that informal routes were adopted for both mental health (56%) and physical health (45%) problems.

Medical students also demonstrate a preference for off-site care due to concerns for confidentiality including accessing services outside their institution of training to avoid bumping into faculty or other students (Brimstone et al., 2007; Dunn et al., 2008; Givens et al., 2002; Hooper et al., 2005; Tjia et al., 2005; Roberts et al., 2001). In the initial study, Roberts et al. (1996) found that 52% of medical students received care at their training institution in their respective medical schools while 47% indicated a preference for care outside their institution. In terms of help-seeking concerns, 70% of students reported concern for confidentiality as the reason they opted for outside care. Givens and Tjia (2002) examined self-reported use of counselling services among medical students and found that between 22% and 26.5% of students who met the criteria for depression and/or suicidal ideation had sought help; roughly half of these sought help through university services and half sought help off-site. The mental health services available to students in this study, although on campus, were independent of the medical school, accessible without referral, and maintained separately from students' academic record. Reasons students provided for not seeking help included: fear of negative impact on academic record, lack of time, stigma, lack of faith in mental health services, their belief and acceptance that stress is a normal part of medical school training, concern around limited number of counselling sessions, concern that drug treatment will be recommended rather than counselling, and concern for confidentiality. In this particular study, depressed students were more concerned with lack of confidentiality.

A longitudinal version of the follow up study conducted by Roberts et al. (2000b) compared students from preclinical to clinical years and found health care needs increased during medical school as did difficulty getting care and not seeking help for health problems. Preference for care outside training institution increased significantly from preclinical to clinical

years and concern for confidentiality was a strong factor associated with this preference. Patterns of informal consultation remained high as did concerns around seeking help for stigma-related phenomena. Students consistently expressed concern about illness-related academic jeopardy. In addition, students repeatedly endorsed responses on the survey vignettes, depicting student impairment, to protect other students' confidentiality even when impairment was obvious.

When compared with other health professional groups, medical students demonstrated a higher degree of reluctance to seek help for mental health issues. A study by Brimstone et al. (2006) compared medical student help-seeking with those of psychology students. Medical students were more likely than psychology students to not seek help for a mental health issue, consult with family and friends, opt for informal consultation with colleagues or classmates, and choose a general practitioner off-site. Both groups felt confident enough to self-diagnose and both expressed concerns about knowing the physician at the health centre.

Personal Health and Self-Care Practices

Self-care practices highlighted in the literature include self-diagnoses and treatment, self-medication, substance use, including both prescription, and non-prescription use, alcohol abuse, and avoiding or delaying seeking care (Dyrbe et al., 2006; Givens et al., 2002; Hughes et al., 1991; Montgomery et al., 2011; Roberts et al., 1996, 2000a; Schwenk et al., 2010; Thompson et al., 2001). A review of self-treatment and self-medication practices among medical students and physicians by Montgomery et al. (2011) found that in 76% of 27 studies reviewed, more than 50% of physicians self-diagnosed, and on average, 61% self-medicated with prescription medications. This percentage also included studies on medical student self-medication practices among residents, although the majority of studies included for review focussed on physician self-

treatment practices. This is largely because medical students early in their training do not have the capacity to self-prescribe and are more likely to ask a resident to write a prescription. Self-medication practices are largely observed among residents and medical interns. One such study of US medical residents included in the review found that 52% of residents also self-prescribed medication (Christie et al., 1998). Key factors identified in their review as contributing to inappropriate self-care practices of physicians and medical students included: avoiding the role of patient, acceptance of self-treatment as the norm, time constraints, pressures to work, and confidentiality. Concern for confidentiality, in particular, was a strong incentive to keep mental health issues private.

Hooper et al. (2005) found that 13% of medical students asked a colleague for a prescription, 9% self-treated, and there was high agreement that it is acceptable for physicians to self-investigate (52%) and self-prescribe medication (39%). Among residents, the prevalence of self-treatment is even higher with 52% reporting having self-prescribed. In terms of how medications were obtained, 42% of the medications were obtained from a hospital supply cabinet while 11% were obtained from a pharmaceutical company or sales representative. These informal routes of self-treatment permit self-medication among residents without concern of documentation on a personal health record. A study by Davidson and Schattner (2003) found that 90% of physicians believed it was acceptable to self-treat acute conditions, 25% felt it was acceptable to treat chronic conditions, and 9% agreed that self-prescribing medication was acceptable.

Findings from the study by Roberts et al. (2000a) highlighted the use of informal consultation adopted by medical students which increases throughout clinical training, and tends to lead to other inappropriate self-care practices and harm. Overall, these findings demonstrate

that self-care practices begin early in medical school training and increase as students' transition through medical school and residency training to practising physicians, implicating the personal self-care practices of physicians and medical students as deeply entrenched in the culture of medicine (Hafferty, 1998; Radcliffe & Lester, 2003; Seritan et al., 2012; Thompson et al., 2001).

Barriers to Care

Medical students consistently report help-seeking behaviours and practices which can negatively impact their well-being and experience unique barriers to health care that are embedded in institutional and cultural practices of medicine. Commonly reported barriers to help-seeking among medical students, which contribute to their reluctance to seek care, include schedule constraints, concern for confidentiality, stigma associated with mental health concerns, fear of unwanted intervention, fear of academic reprisal, difficulties accessing care, cost of care, and time required to make or keep medical appointments (Brimstone et al., 2007; Givens & Tjia, 2002; Tjia et al., 2005; Roberts et al., 2001). Additional barriers were identified in a study by Brimstone et al. (2007) including student perceptions of over-identifying with symptoms in the textbook, confidence to self-diagnose, and concern about knowing the physician at the health centre.

A systematic review of the literature on barriers to care for physicians reveals individual, provider, and system-based barriers (Kay et al., 2008). In terms of individual factors, barriers identified included embarrassment, time constraints, personality factors, and knowledge of health issues or diagnoses and how it can potentially impact insurance, licensing, and clinical practice. For medical students, there tends to be a focus on academic repercussions versus practice consequences (Roberts et al., 2000a). Provider factors are related to issues of privacy of health information and whether seeking help will result in documentation and confidentiality breaches

with negative consequences. System-based barriers refer to structural barriers in the medical school training environment such as long hours, difficulty obtaining care due to schedule constraints, lack of training around appropriate self-care practices and impairment, and issues related to the dual role of being a medical student and a patient (Roberts et al., 2000a).

A study by Givens and Tjia (2002) found that very few students who meet the criteria for major depression or suicidal ideation use available mental health services. System-based barriers were cited more frequently as preventing medical students from seeking help. Barriers identified included: lack of time (48%); lack of confidentiality (37%); stigma (30%); unwanted intervention (26%); and fear of documentation on academic record (24%). Additional barriers identified in an open-ended question section in the survey included: lack of faith in mental health services, stress as being normal in medical school, concern around the limited number of counselling sessions, and concern that drug treatment will be recommended rather than counselling. Further, a comparison of barriers identified by depressed and non-depressed students were similar, except that depressed students were more concerned with lack of confidentiality and fear of unwanted intervention.

Roberts et al. (2000a) examined help-seeking practices and barriers to care in a sample of 1,027 medical students at multiple sites. Reasons indicated for not seeking care included: difficulty in obtaining care (48%), too busy to take time off (37%), excessive waits (24%), worrying about confidentiality (15%), and obtained care informally from colleagues (63%). These findings highlight health services which students perceive to be inconvenient, inaccessible, and not confidential. Students also commonly reported foregoing care due to time constraints and the demands of their schedule. Of particular importance in this study was the institutional variability in students' perceived access to care and in their help seeking practices.

The variability across training institutions was not attributable to age, gender, or training year differences, suggesting that differences in the curriculum and/or training environment may have been more, or less conducive to care-seeking among students.

A qualitative study which examined medical students' experiences of help-seeking for mental health problems (Chew-Graham et al., 2003) identified a major barrier to help-seeking as the perceived stigma associated with 'stress' or 'mental illness'. Themes which emerged in relation to this included: feelings of shame and embarrassment in admitting weakness, fear of confiding in a tutor, fear their problem would not be treated confidentially, concern that admitting to a problem would affect their future career, knowledge of support services, and documentation on their academic record. In terms of students' knowledge of support services, students revealed that they had limited knowledge of services both within and outside the university. As a result, many students expressed a need for advertising services. Students who were aware of services expressed a reluctance to use the services, while other students were assertive in the view that there would be no need for such services if structures within the medical school were improved.

A multi-institutional study in the United States conducted by Dyrbe et al. (2015), explored medical student help-seeking behaviors in relation to perceived stigma, personal experiences of discrimination, and attitudes toward seeking mental health treatment in comparison to age-matched peers in the general U.S. population. Medical student burnout, depression, and quality of life were also assessed. The findings from this study revealed that students experiencing burnout were more likely to perceive stigma, to report having observed supervisors negatively judge students who sought care, or to observe peers disclose another student's emotional or mental health problem to others. Only a third of students with burnout

sought help. Stigma, negative personal experiences, and the influence of the hidden curriculum were contributing factors and acted as barriers to seeking help.

A study by Schwenk et al. (2010) examined medical student attitudes toward mental illness as an additional barrier to care and found that 56% of depressed students agreed that fellow medical students would respect their opinions less and faculty would view them as unable to handle responsibility if they knew they were depressed. Male students were more likely to agree that depressed medical students would endanger patients. First and second year students compared with third and fourth year students more frequently conceded that seeking help for depression would make them feel less intelligent. Brimstone et al. (2006) and Roberts et al. (2000) also found that attitudes toward mental health help-seeking were key in influencing help-seeking behaviours and served as an additional barrier to care.

A large-scale study by Roberts et al. (1996) examined student perceptions of academic vulnerability associated with illness and impairment across nine US medical schools in 1996 and 1997. Perceptions of academic vulnerability associated with seeking help for personal illness were explored as precursors to physician impairment (Roberts et al., 2005). The findings from this study revealed that medical students perceived greater academic jeopardy in relation to stigmatizing health issues. In addition, students indicated that maintaining confidentiality, at all costs, was critical in response to hypothetical situations which depicted severe illness in colleagues even when impairment was obvious or the individual was at risk for suicide. This study highlighted medical student concerns related to specific barriers to care; namely, academic vulnerability and professional repercussions related to seeking care for stigmatizing illnesses. These barriers can prevent or delay recognition of both student and physician illnesses,

potentially leading to impairment and contributing to the culture of silence in medicine (Roberts et al., 2000a; Thompson et al., 2001).

The dual role of medical student-patient can act as an additional barrier to care. In the study by Roberts et al. (2000a), medical student concerns in relation to the dual role of medical student-patient were examined using vignettes which depicted dual roles. The findings from this study demonstrated that medical students typically avoid the dual role of medical student-patient or opt for an intermediate solution which would allow them to avoid the role. In particular, students were more motivated to avoid the dual role if the illness depicted were a stigmatizing health issue due to concerns of perceived vulnerability or academic jeopardy (Roberts, Warner, Smithpeter, Rogers, & Horwitz, 2011). Concern for potential vulnerabilities related to the dual role has been shown to motivate students to seek care off-site from their training institutions, to avail of informal consultation, or to avoid seeking help altogether (Chew-Graham et al., 2003; Hooper et all, 2005; Moutier et al., 2009; Roberts et al., 2011; Tyssen et al., 2004).

Inherent to system-based barriers is the underlying culture of medicine and the enculturation of medical students to the accepted, taken-for-granted beliefs and practices of medicine (Hafferty, 1998; Radcliffe & Lester, 2003; Seritan et al., 2012; Thompson et al., 2001; Worley, 2008). The belief that physicians cannot become ill or take time off work when ill is inherent in medical culture. Physicians are less likely to take sick leave, or to have a family physician. As such, medical students and physicians are under tremendous pressure to be healthy and to 'control' illness (Hooper et al., 2005; Hull, DiLalla, & Dorsey, 2008). Pressure comes both from within medicine and from society at large which places unreasonable expectations and demands on physicians to be strong and self-reliant (Thompson et al., 2001). Self-diagnoses and treatment is understood as an accepted practice among medical students and

physicians (Hooper et al., 2005; Kay et al., 2008). Intervening or reporting impaired colleagues among fellow physicians or students rarely occurs, in fact, many physicians and students report that they would cover for an impaired colleague (Davidson & Schattner, 2003; Givens & Tjia, 2002; Roberts et al., 1996, 2000a; Schwenk et al., 2010; Montgomery et al., 2011).

Chapter 3: Methods

Participants

The proposed population for this study included medical students from years one through four, including both preclerkship and clerkship students, in the Faculty of Medicine at a university in Atlantic Canada. Preclerkship students are students in years 1 and 2 completing preclinical training. Clerkship students are students in years 3 and 4 completing clinical training prior to residency. The age in this population ranged from 20-40 years; the average age was 24 years. The number of eligible participants was 273 students comprised of 162 female and 111 male students.

Measures

Participants were asked to complete a questionnaire (see Appendix E) which included several brief measures: a section on demographics; the Kessler Psychological Distress Scale (K10; Kessler et al., 2003); the Perceived Medical School Stress Scale (PMSS; Vitaliano et al., 1984); and the Medical Student Health Care Survey (MSHS; Roberts et al., 1996).

Demographics. Demographic information was collected on characteristics of age, gender, year of study, marital status, and rural versus urban upbringing for the purpose of this study (see Appendix E, Section 1).

Kessler Psychological Distress Scale (K10). The K10 (Kessler et al., 2003; see Appendix E, Section 2) is a measure of global psychological distress. The measure is used as a brief screening tool to identify levels of distress. A strong association has been found between high scores on the K10 and current diagnosis of anxiety and affective disorders (Andrews & Slade, 2001). The K10 scale includes 10 questions which pertain to emotional states such as anxiety and/or depression experienced in the most recent 4 week period. Each of the questions

has a five-level response scale. Each item in the scale is scored from one (none of the time) to five (all of the time). Scores of the 10 items are then summed, yielding a minimum score of 10 and a maximum score of 50. Low scores indicate low levels of psychological distress and high scores indicate high levels of psychological distress. Optimal cut off score is 24. The positive predictive value (PPV) and the negative predictive value (NPV) for the optimal cut point of the K10 was 0.53 and 0.89. The area under the Receiver Operating Curve (ROC) also referred to as the 'Area Under the Curve' (AUC) for 30-day cases was 0.806 (95% CI 0.749-0.862). Guidelines for screening psychological distress, or the likelihood of having a mental health disorder, include: 10-19 (likely to be well); 20-24 (likely to have mild psychological distress); 25-29 (likely to have moderate psychological distress); 30-50 (likely to have severe psychological distress. Psychometric analysis conducted on these items to determine internal reliability resulted in a Cronbach's alpha of 0.919 (Kessler et al., 1994). In summary, the brevity, strong psychometric properties, and ability to discriminate DSM-IV cases from non-cases make the K10 an important and useful tool in general-purpose health surveys. The scale is currently used in annual government health surveys in the US (National Health Interview Survey) and in Canada (CCHS), as well as the WHO World Mental Health Survey (Kessler et al., 1994, 2003; Statistics Canada, 2012; WHO, 2004).

Perceived Medical School Stress Scale (PMSS). The PMSS (Vitaliano et al., 1984; see Appendix E, Section 3) is a measure which was developed to assess perceived medical school stressors. These are stressors in the medical training environment which students perceive as stressful. The PMSS contains 13 five-point Likert-type items, scored 0 to 4 which assess the degree to which students strongly agreed (4) or strongly disagreed (0) with statements about pressures that occur during medical school. The total score range is from 0 to 52 (high stress).

The measure is typically used in conjunction with a measure of distress to quantify specific stressors in medical school in four main areas: medical school curriculum and environment, personal competence/endurance, social/recreational life, and finances. The 13 items were originally from a pool of 27 items identified through interviews with medical students and counsellors in a pilot study commissioned by the University of Washington Medical School Stress Committee in 1980. In terms of face validity, the items represent major pressures in medical school (Vitaliano et al., 1984). A principal components analysis resulted in two factors which accounted for 88% and 12% of the items' variance. Nine of the 13 items had loadings above .4 on the first factor (ranging from .4 to .72) and three other items had loadings above .5 on the second factor (.5 to .72). The nine items loading on factor one were specific to the medical school environment and the three items loading on factor two were related to endurance and expectations. Item 13 on finances did not load on either factor but was included as it was highly endorsed as an important concern for students. In terms of internal reliability of the 13 items, the coefficient Alpha was .81 which demonstrates the items are measuring a similar construct. In addition, the PMSS has shown a concurrent validity to symptoms of anxiety and depression among medical students (Vitaliano et al., 1984), and a predictive validity on mental health problems in need of treatment four years after graduation from medical school (Chew-Graham et al., 2003).

Medical Student Health Survey (MSHS). The MSHS (Roberts et al., 1996) is a revised survey which was piloted in 1996 to investigate medical students' experiences and perceptions of health care. The survey was approved for use in the current study, but was excluded from the appendices at the request of the author due to copyright restrictions. The MSHS contains 114 dichotomous outcomes, 40 Likert-scale items, and 7 items from 7 case

vignettes. The vignettes focussed on student illness and impairment and depicted situations with varying levels of stigma and changing roles for the student (patient, peer, attending physician). The purpose of the vignettes was to assess differences in student responses which were indicative of stigma and/or dual role conflict. Finally, the survey also included three additional, open-ended questions which allow students to comment on personal experiences of illness or experiences of illness of a family member which may have influenced their decision to become a physician, or to include any additional comments.

The original survey was developed and piloted in 1996 and used to gather preliminary data at the University of the New Mexico School of Medicine (UNM-SOM). A modification of the instrument was then used as the basis for a longitudinal study and a separate cross-sectional multicenter study at 9 medical schools in the United States as well as a separate reliability study at the UNM-SOM. The items on the survey were derived from a literature review and a collaborative multidisciplinary team. Test retest comparisons (Pearson correlations for Likert items and k coefficients for dichotomous items) over a 1-month period produced a mean reliability coefficient of .66 for dichotomous health items, .71 for Likert-scale health items, and .90 for vignette responses (for all 161 items, each $p < .05$). Overall the two sets of responses demonstrated overall stability of the measure; the responses regarding their overall need for health care during medical school were constant ($r = 1.00$, $p < .001$). Specific service-access items were highly consistent ($r = 0.86$, $p < .001$), as were reports of having difficulty obtaining care ($r = 0.86$, $p < .001$), while help-seeking practices demonstrated more variability: not seeking care ($r = 0.45$, $p < .05$); seeking informal care ($r = .56$, $p < .05$); and reasons for informal care ($r = 0.69$, $p < .05$).

Procedure

An ethics proposal to conduct research on a medical student population was reviewed and approved (see Appendix D) by both the Health Research Ethics Authority Board and the Faculty of Medicine. Participants were recruited at specified points in the curriculum when classroom administration of the survey was achievable. For the first, second, and fourth year students, the survey was administered in a Community Health class for which prior approval had been granted by the instructors and the Faculty of Medicine. In the case of third year students, classroom administration was not possible as students are not on site as a classroom unit. Third year students received an email, including the same details as the original information letter (see Appendix A – Information Letter; Appendix C - Email) and a link to an online version of the survey using Fluidsurvey software. The email was distributed with the assistance of the Undergraduate Medical Office. An online survey was not used for all students as classroom administration of a hard copy of the survey was employed to increase participation; students were more likely to participate in a classroom setting.

Participants were given an information letter (see Appendix A) which described the same information that was provided verbally by the researcher (see Appendix B -- Script for in-class recruitment). Participants were informed that the study involved completion of a questionnaire on psychological distress, perceived medical school stressors, personal health care needs and practices, and barriers to care. The participants were informed that their participation was entirely voluntary and that their names would not appear on any forms, reports or passed onto anyone. Participation in this study was not part of their course requirements and would have no impact on course outcomes. Instructors were required to leave the room during questionnaire administration. In addition, participants were informed that they maintain the right to withdraw

from the study at any time without penalty. If students had concerns related to the study, they were instructed to ask the student researcher for further clarification prior to the start of or during the study. Participation in the study and completion of the questionnaire was considered consent to participate in the absence of a signed consent form. For classroom administration of the survey, participants were separated by at least one seat to protect privacy and ensure confidentiality before the study began. To accommodate students who did not wish to participate but did not want to draw attention to their non-participation, they were given the option to 'appear to complete the survey' by doodling and were instructed to write in the additional comments section that they did not wish to participate. They were assured that their surveys would be destroyed and not included in the study.

Participants were given an envelope containing the information letter and a questionnaire for completion. The questionnaire was numbered as identifying information was not obtained. This was done by the researcher prior to survey administration and involved computer generated, random numbering of the questionnaires so that the original data source could later be linked to the data file to ensure the data was entered correctly, or in the event the researcher needed to return to the original data source to correct errors detected in the electronic data file. Survey administration took approximately 15 - 20 minutes. The data was used only by the researcher associated with the study and for the purposes of research publication, conferences, or teaching material. After completion of the questionnaire in a classroom setting, participants were asked to place their sealed envelopes, containing their questionnaires, in a box at the front of the classroom. All participants were thanked for their time and participation in the study.

Statistical Analysis

Quantitative data collected was analyzed using parametric and non-parametric statistical methods. SPSS version 21 for windows was used to run these analyses. Demographic data was analyzed using frequency counts and was used to describe the sample. Specific demographic information was analyzed to further assess study objectives.

The first objective was to determine the prevalence of psychological distress among a sample of medical students and compare level of distress with age-matched peers in the general population. This was accomplished using the K10 (see Appendix E, Section 2). To assess the level and prevalence of psychological distress, items on the scale were summed to yield a score for each student, with an optimal cut off score of 24. Scores below 24 (10-19) ranged from likely to be well to mild psychological distress (20-24). Scores above 24 ranged from moderate psychological distress (25-29) to severe psychological distress (30-50). To compare distress levels between medical students and peers in the general population, a one-sample t-test was conducted comparing the population mean on the K10 in the medical student population (age 24-34 years) to the population mean derived from the general population using all eligible participants (age 24-34 years). Data for the comparison group was obtained from the CCHS 1.2 survey data (Statistics Canada, 2012) and reflected the same ratio of males to females. Due to the low number of respondents in the medical student population among the higher age groups (35-45), the age group selected for comparison of distress levels collapsed two age categories (<24 years and 25-34 years) which contained the majority of respondents. The same age categories were collapsed in the CCHS population.

The second objective was to compare level of psychological distress across level or year of training. To achieve this objective, a one-way ANOVA was used to compare mean item

scores on the K10 across level or year of training. Post hoc analysis using Tukey's (HSD) was included in this analysis. One-way ANOVA was also used to analyze additional demographic variables including gender, rural/urban, single/married, children/no children to further assess differences in distress level within the medical student sample.

The third objective was to assess and compare perceived medical school stress and identify factors which may contribute to distress at various levels of training. This was achieved using the PMSS (see Appendix E, section 3). Descriptive analyses including frequency, mean, and standard deviation were run to assess perceived medical school stressors identified by students. A one-way ANOVA was run to compare perceived stressors (PMSS) by demographic variable and by level of distress (K10). Finally, logistic regression analyses were run to determine which PMSS factors (medical school curriculum/environment, social life and recreation, personal competence/endurance, finances, accommodation concerns) best predicted level of psychological distress as measured by the K10.

The fourth and fifth objectives included exploration of the personal health care needs and practices of a sample of medical students and identification of potential barriers to care. This was achieved using the MSHS. Descriptive analyses were used to identify the frequency of responses related to specific health care needs and practices, health concerns, concern for developing health or personal problems and barriers to care. Cross-tabulation and chi-square analyses were also employed to assess potential gender and training year differences in terms of health needs and practices, and barriers to care.

In addition, the fifth objective was further achieved using descriptive analyses to assess the frequency of various barriers to care identified by students including perceptions of health concerns that may impact academic status. One-way ANOVA was used to assess gender and

training year differences related to student reluctance to proceed with dual role of student/patient in four scenarios which ranged from low-to-high stigma health issues. One-way ANOVA was also employed to assess gender and training year differences related to student reluctance to report impairment in another student in three scenarios which ranged from low-to-high stigma consequences. Responses to the dual role vignettes were assigned to 3 points along a continuum as follows: 1 = "proceed with appointment/rotation that day" (accept the dual role), 2 = "seek help informally/offsite or speak with attending" (an intermediate solution), and 3 = "leave the clinic that day or adopt a wait and see attitude" (avoid the dual role). Responses to the impairment vignettes were similarly assigned as follows: 1 = "tell no one" (protecting student confidentiality), 2 = "seek advice" (an intermediate solution), and 3 = "notify the Dean" (reporting student impairment). In both cases, responses to choice 4 (other action) were recoded as an intermediate response.

Finally, comments included in an open-ended question at the end of the survey, which invited additional comments or reflections from students, were reviewed to identify and summarize key themes pertaining to medical student health needs, concerns, perceptions, help-seeking practices, and barriers to care. Student comments were incorporated as quotes in the body of the text where appropriate.

For all research objectives tested in the current study, the level of significance at which Null hypothesis was rejected was $p < .05$.

Chapter 4: Results

In total 275 medical students in first, second, third and fourth year were approached to participate in the study; 180 students from the total sample agreed to participate in the study and completed the survey for a response rate of 66%. Of those 180 students, 62 were first year students, 45 were second year students, 22 were third year students, and 51 were fourth year medical students. A summary of demographic data obtained on age, sex, marital status, children, rural versus urban upbringing, and year of training for the subsample is shown in Table 1.

The prevalence of medical student distress, the proportion of the total sample (n = 180) who scored above 24 on the K10 (see Appendix E, section 2), was 17.2%. Descriptive analyses of scores on the K10 (Kessler et al., 2003) revealed a mean score of 18.9 (SD = 5.6). A one-sample t-test was conducted to compare the mean item score on the K10 in the medical student population (ages 24-34 years) to a similar group, based on age and gender ratio, in the general population using the CCHS 1.2 survey data (Statistics Canada, 2012). Results from this analysis revealed a significant difference in terms of the level of distress experienced by medical students (M = 18.9; SD = 5.6) compared to distress levels in the general population (M = 5.3; SD = 5.2); t (179) = 32.6, p = .000.

In terms of the total distress score among the sample of 180 students, 19.4 % (N=35) of medical students reported mild to moderate levels of distress while 17.2% (N = 31) of medical students reported scores greater than 24, the optimal cut off score indicating moderate to high levels of psychological distress. Among these students, 10.0% (N = 18) reported scores between 25 and 29 (moderate psychological distress); 7.2% (N = 13) reported scores between 30 and 50 (severe psychological distress; Kessler et al., 2003). Comparison of mean item scores on the K10 across level or year of training using a one-way ANOVA including post hoc analysis using

Tukey's (HSD) resulted in a significant difference between second year and fourth year F (3, 176) = 2.90, p = .03). The mean score for second year (M = 20.0; SD = 6.1) was significantly higher than the mean score for fourth year (M = 17.0; SD = 4.2) in comparison to either first year (M = 19.4; SD = 5.8) or third year (M = 19.9; SD = 6.1). However, these analyses lack power due to the low number of participants in the third year class (N = 22); the observed power for this comparison was 68.4%. In addition, the difference in mean scores does not reach clinical significance (the cut off score for moderate to high distress is <24). A significant effect was found for gender; females reported higher levels of distress than males, F (1, 177) = 3.90, p = .05. A summary of mean scores on the K10 by demographics, including total score, scores between 25 and 29, and scores between 30 and 50 are shown in Table 2.

Descriptive analyses of scores on the PMSS (Vitaliano et al., 1984) revealed an average mean score of 20.9 (SD =7.7). Ratings were obtained on a 5-point scale, with 3 as "neither agree nor disagree". The total score of the items was used to indicate the overall level of perceived stress among the students, where a high score indicated a high level of perceived stress. In terms of the total score, 26.7% (N = 48) of medical students reported scores greater than 26 indicating moderate-to-high levels of perceived stress related to factors specific to medical school training or the environment. No cut off has been established for this scale; the scale was primarily developed to predict factors which contribute to distress among medical students (Vitaliano et al., 1984). Mean scores on the PMSS subscales by demographic variable and by level of distress are reported in Table 3 and Table 4. Frequency analyses of subscale items on the PMSS are presented in Table 5.

One-way ANOVA revealed a significant difference in mean scores by gender and by training year. Gender differences were found with females reporting more perceived stress in

relation to social life and recreation factor, F (1, 177) = 4.19, p = .042 and personal competence and endurance, F (1, 177) = 8.49, p = .004. Training year differences were found for third year in terms of the overall mean score of 27.1 (SD = 7.0), F (3, 176) = 6.21, p = .000; curriculum environment, F (3, 176) = 6.99, p = .000; social life and recreation, F (3, 176) = 3.02, p = .031; and personal competence and endurance, F (3, 176) = 3.72, p = .013. A significant difference was also found in mean scores on the K10 by PMSS subscale items including: curriculum environment, F (23, 156) = 2.59, p = .000; social life and recreation, F (23, 156) = 2.81, p = .000; and personal competence and endurance, F (23, 156) = 4.66, p = .000.

Stepwise regression analyses were employed to determine predictors of medical student distress. Demographic variables entered into the model included age, training year, and gender. All PMSS subscale variables were entered into the regression model. Personal competence and endurance, training year, and social life and recreation accounted for a significant proportion of the variance (R^2 = .295) on the K10 total score: F (3, 174) = 24.3, p = .00. A model summary of predictors is shown in Table 6. All other variables were excluded from the model. A univariate analysis was performed to test for an interaction between the independent variables: personal competence and endurance and training year. There was no significant interaction between personal competence and endurance and training year, F = (37, 121) = .958, p = .544.

Further analyses of individual subscale item responses, revealed two items originally included under the medical school curriculum and environment subscale (Vitaliano et al., 1984) as accounting for a significant proportion of the variance in K10 scores: “medical training controls my life” (R^2 = .16), F (1, 178) = 32.9, p = .00; and “medical school is more threat than challenge”: (R^2 = .21), F (2, 177) = 23.54, p = .00. Long hours and responsibility accounted for the variation in the personal competence and endurance subscale, (R^2 = .25), F (3, 176) = 18.99,

$p = .00$. Finally, a comparison of mean item scores on the PMSS across level or year of training using one-way ANOVA showed a main effect of training year on stressors perceived by medical students, F (3, 176) = .6.21, $p = .00$. Post hoc analysis using Tukey's HSD indicated a significant difference in mean perceived stressor scores between Year 3 (M = 27.1; SD = 7.0) and Year 1 (M = 19.4; SD = 7.4), Year 2 (M = 20.7; SD = 7.9), and Year 4 (M = 20.2; SD = 7.2). Perceived stressors in Year 1 did not differ significantly from either Year 2 or 4 and Year 2 did not differ significantly from Year 4.

Descriptive analyses of the frequency of responses specific to health care needs are reported in Table 7. Frequency analyses of preference for site of care pertaining to various health needs are shown in Table 8. Analyses to test for significance could not be performed on health need variables or preference for site of care variables as these variables are constants. Frequency analyses of health needs, access, and barriers to care are illustrated in Table 9. Analyses to test for significance could not be performed on variables pertaining to insurance, confidentiality policies, and reasons for not seeking care or informal consultation. Cross-tabulation and chi-square analyses included frequency of responses across level or year of training and by gender. Significant gender differences were found with females indicating more health needs, X^2 (1, N = 179) = 6.832, $p = .009$, and greater difficulty getting health care, X^2 (1, N = 179) = 10.07, $p = .002$. A significant difference was also found for training year with clerkship students (clinical students in years 3 and 4) reporting more difficulty getting health care, X^2 (1, N = 180) = 5.827, $p = .016$.

Frequency analyses of responses on the MSHS pertaining to medical student concerns of health or personal problems that students fear they will develop during medical school are

reported in Table 10. Additional frequency analyses of medical student perceptions of health concerns that students believe would impact their academic status are shown in Table 11.

Frequency analyses of the vignette responses on medical student reluctance to proceed with dual role as patient and student in four hypothetical scenarios are shown in Table 12. One-way ANOVA revealed a significant gender difference with females indicating more reluctance to proceed with the dual role of patient-student for severe gastrointestinal symptoms related to exam stress (low stigma), F (1, 177) = 6.13, p = .001. A significant difference was also found for training year with third year students indicating a greater degree of reluctance to proceed with the dual role of an unmarried student needing a pregnancy test (high stigma), F (3, 176) = 4.11, p = .008. In terms of whether students would accept the dual role, choose an intermediate solution, or avoid the dual role in the four scenarios, One-way ANOVA revealed that students opted for an intermediate solution to self-diagnose, seek informal or off-site care, or delay seeking care in the unmarried, pregnant student scenario, F (11, 168) = 8.41 , p = .000 or avoided the dual role in the student with panic disorder scenario, F (11, 168) = 8.97, p = .000 for high stigma scenarios, and accepted the dual role for low stigma scenarios including severe gastro symptoms related to exam stress F (11, 168) = 7.27, p = .000 and hypertension F (11, 168) = 6.14, p = .000.

Finally, frequency analyses of vignette responses on medical student reluctance to report an impaired colleague or student in three hypothetical scenarios are shown in Table 13. One-way ANOVA revealed a significant gender difference with males indicating a greater degree of reluctance to report an anatomy lab partner with symptoms of suicidal ideation in the high stigma-consequences scenario, F (1, 177) = 4.1, p = .044. No significant difference was found for training year in any of the three scenarios. In terms of whether students would report

impairment, choose an intermediate solution (an informal solution which does not involve medical school administration and protects student anonymity), or avoid reporting an impaired student or colleague in three scenarios depicting peers in various levels of impairment (a lab partner with symptoms of suicidal ideation, a student abusing alcohol and amphetamines, and a student with diabetes behaving erratically), a one-way ANOVA revealed a significant difference between choosing an intermediate solution and reporting the impairment to administration or avoiding reporting impairment in both high stigma- and low stigma consequences. Students opted for an intermediate solution in the three scenarios as follows: anatomy lab partner with symptoms of suicidal ideation in high stigma consequences for reporting, F (11, 168) = 4.40, p = .000; third year student with significant alcohol and amphetamine abuse in high stigma consequences for reporting, F (11, 168) = 2.09, p = .023; and a third year student with diabetes who is distressed and whose performance is erratic, F (11, 168) = 4.97, p = .000.

Chapter 5: Discussion

Prevalence of Medical Student Distress

The prevalence of psychological distress in the current study sample (17.2%) is consistent with findings in the literature on medical student distress which typically demonstrates higher overall psychological distress among medical students than in the general population (Compton et al., 2008; Dyrbe et al., 2006; Earle & Kelly, 2005; Goebert et al., 2009). Of those students experiencing moderate-to-severe distress, 7% of students in the current study met the criteria for severe psychological distress indicating clinically significant levels of distress. This percentage is extremely disconcerting given the K10 has been shown to predict current, clinical diagnoses of anxiety and affective disorders (Andrews & Slade, 2001). Research has shown that individuals entering medical school do not differ from the general population in terms of psychological status (Dyrbe et al., 2015); and in fact, appear to develop psychological health issues in medical school. In addition, psychological distress experienced by students is chronic, not likely to be episodic, and tends to persist throughout training (Compton et al., 2008; Dyrbe et al., 2006; Grotmol, Gude, Moum, Vaglum, & Tyssen, 2013; Rosal et al., 1997; Tyssen et al., 2001b). In the current study, although distress levels as measured by the K10 were higher among second year students as compared with first year students, levels decreased by fourth year. Inconsistent with these findings, third year students perceived more stress in relation to the medical training environment, as measured by the PMSS, yet reported lower levels of distress on the K10.

Research which has compared medical student distress to that experienced by other professional students and/or graduate students including law, engineering, and psychology students, have demonstrated that high levels of distress are not limited to medical training (Leah

et al., 2010). In one Canadian study, graduate science students experienced higher levels of distress than medical students at four Canadian Schools of Medicine (Toews et al., 1997). These findings, however, do not diminish the importance of understanding distress among medical students, particularly as the psychological status of medical students changes significantly as they progress through their studies with levels of distress continuing to increase throughout training, potentially resulting in persistent, chronic, long-term mental health problems which can impact their ability to practice effectively later as clinical clerks, residents, and ultimately physicians (Center et al., 2003; Greenup, 2008; Kay et al., 2008; Norris et al., 2010; Worley, 2008; Thompson et al., 2001). Most students experience distress during medical school; however, when the stress manifests in various forms such as anxiety, burnout, depression, and fatigue, students who experience more dimensions of distress are at increased risk for suicidal ideation, a risk factor for suicide (Dyrbe et al., 2011; Tyssen et al.,2001). In the current study, 7% of the student population reported severe levels of distress, indicative of multiple dimensions of distress such as anxiety and affective disorders and an increased risk for suicidal ideation.

Characteristics of Distressed Sample

The students who comprised the moderately to severely distressed group were between 24 and 29 years, were typically single, female, raised in urban settings, and transitioning from their final year of preclinical training in second year to third year clerkship. The highly distressed group were similar in terms of demographic characteristics. The only differences between the moderately and severely distressed groups which were statistically significant, however, were related to gender and training year. Female students in the current study reported higher levels of distress than male students. Research on medical student distress supports the finding that female medical students report higher levels of distress than their male counterparts

(Dahlin et al., 2005; Dyrbe et al., 2006; Goebert et al., 2009), but this may be more reflective of the generally recognized gender differences in reporting (Gijsbers van wijk et al., 1999; McDonough & Walters, 2001; Verbrugge, 1989) than actual differences in distress levels.

In terms of the differences found in distress levels across level or year of training, a significant decrease was found between second and fourth year, which is not consistent with findings in the literature that distress levels increase from preclinical to clinical training (Chandavarkar, Assam, & Mathews, 2006; Dyrbye et al., 2006). Numerous studies have shown that mental health actually worsens throughout the course of training (Givens & Tjia, 2002; Rosal et al., 1997; Tyssen et al., 2001b). In the current study distress levels were found to be significantly lower in fourth year than in second year. However, this difference does not have any clinical significance given the mean scores for each training year were included in the categories of "likely to be well" (10-19) and "mild psychological distress" (20-24). The small number of participants in the third year class might explain these findings as the observed power for these analyses was only 68.4%. In addition, survey administration which occurred at the end of second year coincided with students preparing for their third year of clinical training, a major transition point which has been identified in the literature as particularly stressful because students are expected to incorporate medical knowledge previously acquired and apply it in clinical settings (Radcliffe & Lester, 2003; Rosal et al., 1997). The lower distress levels in fourth year may also be related to an increased sense of competence that comes with higher levels of medical training (Chandavarkar et al., 2006) and the increased opportunities to complete medical rotations. In the current study, fourth year students supported this finding: "If I had completed this survey during third year my answers would be very different. Third year is 'extremely' emotionally taxing and isolating. I think this survey and interventions should be

directed at third year." A third year student elaborated, providing further support for the finding that third year clerkship is particularly stressful: "A major issue is that we are not allowed breaks during clerkship. In first and second year there is protected time on Tuesday which is a lifesaver. In clerkship we have no such luxury. On rotations where we do call till 12pm we don't even get a post call day where you can drag yourself out of bed and into the doctor if worst comes to worst."

Factors Predicting Medical Student Distress

The high prevalence of psychological distress among medical students in the current study underscores the importance of understanding factors which contribute to this distress. Previous studies have shown that perceived medical school stress is in an independent predictor of mental health issues which develop during medical school (Tyssen et al., 2001b). The elevated scores on the PMSS in the current study indicate a high level of perceived stress related specifically to medical school training. Personal competence and endurance, training year, and social life/recreation accounted for a significant proportion of the variance in medical student distress among this population.

Perceived competence and endurance has been identified as a key stressor in medical school and constitutes one of the main subscale factors on the PMSS (Vitaliano et al., 1984). In the current study, personal competence and endurance accounted for the most variance (25.8%) in terms of distress levels among students. The fear of incompetence pertains not only to students' perceptions of their own competence and ability but also to their fear of making a mistake and the perceived lack of support from medical school faculty and/or administrators. The quality of student-faculty relations can affect students' confidence in their abilities and perceptions of competence (Vitaliano et al., 1984). One student in the current study commented:

"Medical students live in constant fear of failing and this often takes its toll on self- esteem, sense of well-being and relationships." Perceived competence has consistently been associated in the literature with medical student distress; namely, depressive symptoms, anxiety and generalized psychological distress (Chandavarkar et al., 2007). In addition, perceived lack of diagnostic skills and concern about personal competence has been identified as predicting later mental health problems among medical students severe enough to require treatment (Midtgaard et al., 2008; Grotmol et al., 2013; Tyssen et al., 2001).

The medical school curriculum and environment factor was originally comprised of three items: "medical school controls my life", "medical school is more threat than challenge", and long hours and responsibility. In the current study, these items accounted for a significant proportion of the variance in distress scores (21%, 16%, and 25% respectively). Mastering the pool of medical knowledge was highly endorsed as a stressor by 62% of students, while the perception that medical school controlled one's life leaving little time for social activities or family and friends was endorsed by 40% of students. The perception that personal success in medical school occurred in spite of administration was endorsed by 38% of students reflecting a negative perception held by students of the medical school environment and the perceived lack of support from administration. Students in the current study commented further on these perceptions: "UGME is more of a barrier to our success and well-being in the curriculum than a help. Many of us do not feel fully supported by their policies, flexibility, rather, and are not entirely comfortable interacting with that office." Another student commented: "My only sources of anxiety and depression throughout medical school have surrounded the administration leaking personal information and their discrimination." Perceived lack of support has been highlighted in the literature as both contributing to student distress and creating barriers to care

(Midtgaard et al., 2008; Radcliffe & Lester, 2003; Tyssen et al., 2001b). A large, nationally representative study in the US found that students' perception of the medical school taking steps to minimize student distress and provide support correlated with lower distress levels among students (Compton et al., 2008).

Social life and personal development can also be negatively affected by medical school training due to schedule constraints and work load which do not allow sufficient time for recreation, family and friends (Vitaliano et al., 1984): "I knew it was a rigorous program, but the schedule - very little free time during weekdays to study/attend to personal business like appointments/work on hobbies." Social and recreational activities have the potential to reduce stress in medical school, yet have been shown to actually decrease over the course of medical training (Kjeldstadli et al., 2013). This decrease has been associated with impaired psychological health among medical students (Kjeldstadli et al., 2013; Rosal et al., 1997). Medical students who report higher levels of life satisfaction tend to perceive medical school as interfering less with their social and personal life (Kjeldstadli et al., 2013). In terms of gender differences related to social life and recreational activities, in the current study female students reported that medical school interfered more with social life and recreational activities than male students. Given these are important factors in reducing stress, these findings may explain why female students also reported higher levels of distress (Flaherty & Richman, 1989; Haines, Hurlbert, & Zimmer, 1991; Kjeldstadli et al., 2013; Rosal et al., 1997). While both male and female students shared concerns about personal competence and endurance, female students perceived significantly more stress in relation to this factor; namely, whether they could master the pool of medical knowledge and endure the long hours required in medical training. The finding in gender differences would need to be investigated further, as there may be reporting

differences in terms of females being more likely to report distress and admit they are having difficulty (Gijsbers van wijk, Huisman, & Kolk, 1999; McDonough & Walters, 2001 Verbrugge, 1985).

Training year differences on perceived medical school stress, as assessed by the PMSS, were found with the greatest difference between years 1 and 3. Third years clerks reported significantly more perceived stress in relation to the curriculum and the medical school environment, limited social life and recreational activities, and their own sense of personal competence and endurance in comparison to all other training years. This finding is inconsistent with differences in psychological distress, as assessed by the K10, which were found between second and fourth year. One explanation for this inconsistency pertains to the low number of students who participated in third year (N = 22) and the corresponding, observed power of 68.4% which did not allow for detection of meaningful differences in mean scores across training year.

Despite the low recruitment of third year students in the current study, however, third year students reported significantly more perceived stress, as assessed by the PMSS, in relation to the curriculum environment. This could be interpreted as third year students perceiving factors in the medical training environment as more stressful compared to other training years, or students experiencing more stress in third year may have been more motivated to participate in the study. High scores on the PMSS toward the end of medical school training have been found to predict mental health problems requiring treatment later in postgraduate students (Tyssen et al., 2001). This finding highlights the challenges experienced by third year students transitioning to clerkship and their appraisal of the environment as stressful. However, perceptions of stress do not necessarily translate into concurrent symptoms of distress, and given the low number of third year students in the study (N = 22), training year differences in distress (K10) could not be

determined statistically. Third year clerkship marks an important transition from classroom studies and simulated patient experiences to clinical practice and interactions with actual patients, as well as increased level of responsibility, long working hours, sleep deprivation, schedule constraints and limited time for family, friends or recreational activities (Chandavarkar et al., 2006; Dunn, Iglewicz, & Moutier, 2008; Radcliffe & Lester, 2003), important social support factors that would normally act as a buffer against stressful experiences (Haines et al., 1991; Strayhorn, 1989).

Medical Student Health Care Needs, Wants, and Concerns

The majority of medical students in the current study (86%) identified needing health care at some point during medical school. Commonly reported health needs and practices included needing or wanting care as it pertained to regular health maintenance (65%), routine immunization (63.9%), cold or flu symptoms (42.2%), fatigue (28.3%), stress (28.3%), other infections (25.6%), anxiety (23.9%), headaches (23.9%), gastrointestinal complaints (19.4%), injury (13.3%), depression (11.1%), pain (10.6%), and problems eating (10%). These findings are consistent with findings in the literature (Roberts et al., 1996, 2000a) and highlight the importance of understanding medical student health needs and health care. Medical students may be more aware of symptoms pertaining to various health issues, and as such, more likely to report health needs (Roberts et al., 2000a). The study also highlights mental health issues consistent with the literature on medical student distress as well as the perceived need for health care in medical school (Givens & Tjia, 2002; Midtgaard et al., 2008; Roberts et al., 2000a).

In addition to reported health needs, medical students also reported concern they may develop certain health issues or personal problems in medical school. Medical students in the current study indicated concern they would develop anxiety issues (46.7%), marital or

relationship problems (46.1%), depression (39.4%), HIV training exposure (21.1%), other serious infection such as hepatitis, tuberculosis (19.5%), an eating disorder (8.4%), alcohol abuse issues (8.4%), or prescription drug use (2.8%) during their training. Given the high level of perceived medical school stress reported in this study, and the medical school factors contributing to this distress (perceived competence and endurance, impact on social life, and medical school curriculum and environment) the concerns students have are not surprising. If a student perceives high levels of stress in relation to work demands and long hours, then it is intuitive that the student would also be concerned about the impact on relationships outside the medical school. Likewise, if a student has concerns about personal competence and endurance, then anxiety issues and maladaptive coping strategies may be a real concern, particularly if the student has previously engaged in harmful, self-care practices. These health concerns among medical students are supported in the literature on medical student health needs, concerns, and practices (Dyrbe et al., 2006; Givens & Tjia, 2002; Hughes et al., 1991; Kay et al., 2008; Robersts et al., 1996; Roberts et al., 2000a; Schwenk et al., 2010). Concern about exposure to infectious agents and disease during training are also consistent with the literature and are anticipated given the increased risk for exposure among health professional trainees (Dunn et al., 2009; Roberts et al., 2011).

Help Seeking Practices and Barriers to Care

In general, medical students are reluctant to seek help for mental health and other stigmatizing health issues (Brimstone et al., 2007; Hooper et al., 2005; Roberts et al., 1996, 2000a). In the current study, while the majority of medical students identified needing health care (86%), 52% of those students did not seek help and indicated experiencing difficulty accessing care. Students who reported experiencing difficulty cited three key reasons: being too

busy to take time off (46.7%), excessive wait to be seen (18%), and concern for confidentiality (9%). These findings demonstrate a need for improved access to and availability of confidential care both in terms of physical health complaints, some which may be somatic manifestations of distress, and mental health issues in need of treatment (Midtgaard et al., 2008; Roberts et al., 1996, 2000a).

Students in the current study specifically commented on system barriers to care, including issues of confidentiality, stigma, time constraints and long waits to be seen by student health services, as well as the distance required to travel to physician clinics, designated by the medical school for student care, off site. In terms of comments around stigma, one student commented: "The discrimination, sexism, and confidentiality breaches in personal information have been disheartening." Time constraints and scheduling issues were important barriers identified: "Very difficult to find time to make medical appointments"; and "The wait for appointments at the Student Health Centre at MUN can be weeks long." The brevity of appointments was another issue identified: "Brevity of student health appointments was alarming!" Students also commented on issues pertaining to difficulty accessing care: "Getting access to adequate mental health care is hard. There is very little available, especially outside of class time." Finally, students often delayed or avoided seeking care or minimized the health problem: "Afraid to take time off and miss important lectures or get behind in my work. Also, thinking the problem will go away whether or not I see someone, or putting off making an appointment until a less busy time".

Preference for Site of Care.

The literature suggests that when students do seek help, they are more likely to opt for off-site care (Brimstone et al., 2007; Dunn et al. 2008; Givens et al., 2002; Hooper et al., 2005;

Tjia et al., 2005; Roberts et al., 2001). Consistent with these findings, students in the current study indicated a preference for off-site care in relation to mental health needs (80%) as compared with physical health needs (20%). Preference for on-site care pertained mostly to non-stigmatizing health concerns and included: vaccinations (82%), cold or flu (74%), chest pain (66%), injury (65%), regular health maintenance (64%), infection (59%), elective surgery (52%) and HIV testing related to exposure in a training setting (49%). In comparison, preference for off-site care applied largely to care related to stigmatizing health concerns: alcohol problems (84%), drug problems (83%), HIV testing personal exposure (83%), prescription drug problems (82%), problems eating (81%), depression (78%), anxiety (76%), and stress (67%). Students in the current study commented on their preference for off-site care:

> I know another issue at MUN is that the counselling office is right inside UGME where everyone goes to get paperwork done, etc. Often classmates have run into issues with this. I know of at least one classmate who stopped going to counselling because it was too difficult to accommodate meeting outside the hospital, and it was too embarrassing to meet in the current location.

Students also commented on issues of confidentiality and knowing the physician: "Small community feel here...not many options for care outside of our training institution." Concern for confidentiality as it pertained to academic vulnerability was also evident: "I think that the fear associated with getting care and not having it affect your medical school file, especially for mental illness, is a big concern. Students know that faculty discuss students and being in NL often roles of specialists overlap with academic positions." Another student commented: "The Student Health Centre is pretty good but most of the doctors there teach us classes." These comments reflect student perceptions and concerns that are consistent with the literature on

medical student reluctance to seek help for stigmatizing health issues, in particular mental health issues, and their preference for offsite care to protect confidentiality (Givens et al., 2002; Roberts et al., 2000) and to avoid bumping into tutors or other students (Dunn et al., 2008; Givens et al., 2002; Hooper et al., 2005).

Overall these findings highlight stigma as an important barrier to mental health care for students in the current study. As evidenced in the findings and student comments, the stigma of mental health can prevent or delay students from seeking help, potentially compounding any existing mental health issues. Students' avoidance of seeking appropriate care may also explain the high rates of psychological distress found which reached clinically significant levels in the population under study. The potential consequences of avoidant or delayed help seeking, within the context of such high levels of distress, include poor mental health outcomes, impairment, suicidal ideation, and suicide (Dyrbe et al., 2006; Givens & Tjia, 2002; Roberts et al., 1996, 2000a; Schwenk et al., 2010). Also of importance to note, these findings were not limited to mental health issues or stigmatizing health problems. In the open-ended section of the survey, a number of students indicated concern they may be perceived negatively by the attending physician when seeking care for common physical health complaints: "Worried about doc seeing me as frequent flyer"; "Not allowed to take time off without doctors' note. Too much hassle to fill out astronomical paper work for missed half day/full day"; "Often felt like it wasn't acceptable to take time off rotations for appointments"; "I don't like to see a physician unless I am 'really' sick." These perceptions by students that seeking help for even common illnesses or health complaints is a sign of weakness points to the socialization of medical students as future physicians to deny or minimize illness, avoid seeking help, in particular for stigmatizing health issues, to opt for informal or curbside care, and to become excessively self-reliant, potentially

developing inappropriate or harmful self-care practices which may lead to impairment or long-term health consequences. These cultural practices are learned through the training environment by way of the informal and hidden curriculum (Pitkala & Mantyranta, 2003; Shuval, 1975).

Informal Consultation.

Informal consultation has been identified as an alternative help-seeking practice among medical students which bypasses the more formal routes to health care; it involves curbside consultation with colleagues or peers to address health issues and is a common practice among medical students and physicians (Dunn et al., 2008; Givens et al., 2002; Hooper et al., 2005; Roberts et al., 2000a). In the current study, 50% of students sought informal consultation; 40% were preclerkship students and 62% were clerkship students. This finding is consistent with the literature in that the practice of informal consultation adopted early in training tends to increase throughout clinical training as students acquire more clinical skills and the ability to diagnose symptoms in peers and prescribe medication (Dunn et al., 2008; Givens et al., 2002; Hooper et al., 2005; Roberts, Warner, & Trumpower, 2000). Commonly reported barriers to formal care which facilitated medical students seeking informal care in the current study included: convenience or accessibility (50%), takes less time (39%), and protects confidentiality (4%). Students commented that it is easier and takes less time to obtain care informally as compared with more formal routes. One student commented that "the wait for appointments at the Student Health Centre at MUN can be weeks long," while another student commented: "Both my roommates are doctors - I guess that helps," suggesting both convenience and accessibility to care. In the latter case, the student may also have observed informal care practices and understood them as acceptable practice.

Self-Care.

In terms of self-care, while the MSHS did not define health practices or behaviours in terms of 'self-care' practices, students in the current study reported having alcohol problems (4%), drug problems (1%) and prescription drug problems (3%). These practices are inappropriate forms of self-care that medical students engage in as an alternative to help seeking or informal consultation (Dyrbe et al., 2006; Givens et al., 2002; Hughes et al., 1991; Montgomery et al., 2011; Roberts et al., 2000a; Schwenk et al., 2010). As previously noted, more than 50% of students in the current study indicated that they did not seek help for mental health or physical health issues identified, while 50% of those who did seek help, sought help through informal means. Clerkship students reported marginally higher use of alcohol, drugs, and prescription drugs in particular, in comparison to pre-clerkship students. The literature on self-care practices among medical students shows a tendency for these practices to increase throughout medical training (Dyrbe et al., 2006; Roberts et al., 2000b; Thompson et al., 2001). Key factors identified in the literature and evidenced in the current study which contributed to inappropriate self-care practices included avoiding the role of patient, acceptance of self-treatment as the norm in medicine, time constraints, pressures to work, and confidentiality concerns (Hooper et al., 2005; Montgomery et al., 2011; Roberts et al., 2011).

Many of these factors highlight systemic or structural issues in the medical school curriculum and environment which facilitate informal consultation and inappropriate self-care while simultaneously creating barriers to seeking appropriate care. Schedule constraints play a key role in terms of students' decisions to self-treat as they are reluctant to take time away from studies, or to miss time from a clinical rotation. Students in the current study also made specific reference to how their absences on clinical rotations are perceived by supervisors: "Often felt

like it wasn't acceptable to take time off rotations for appointments"; "I find that residents and staff are not always understanding or accommodating of my need to put my recovery as a priority over holding retractors in the OR"; "In Clerkship it was often difficult (uncomfortable) to ask preceptors to allow you to leave for appointments"; "I want to have children and was considering having my first one during residency (mainly because of my age), but have been told that although there are guidelines, there is heavy guilt associated with following them (e.g., only working 40 hours a week in last trimester)." These comments demonstrate how medical students are socialized to the informal curriculum to 'control' illness and perpetuate the unrealistic image of the strong, self-reliant physician which becomes maladaptive in the extreme - a superior human being who cannot be ill or even prioritize their own health needs. These beliefs can result in inappropriate self-care practices and contribute to long-term health issues (Hooper et al., 2005; Kay et al., 2008; Miller & Mcgowen, 2000; Montgomery et al., 2011). Cultural attitudes transmitted through the informal and hidden curriculum in the training environment compound the barriers to help seeking. Students delay or avoid taking time for personal health needs in order to prevent being perceived as weak or uncommitted by supervisors or peers. For clinical students, there are also powerful, cultural proscriptions which prevent them from using sick leave and burdening peers or colleages with additional work (Cupples, Bradley, Sibbett, & Roberts et al., 2011; Thompson, 2001, 2002).

Knowledge of mental health services and policies.

Medical students' knowledge or lack of awareness around mental health insurance coverage and confidentiality policies may also serve as an additional barrier to help seeking. In the current study, 66% of students did not know if their health insurance provided coverage for counselling services; 84% of students aware of coverage thought the policy required that care be

received through their training institution. Given that 82% of students also indicated a preference for insurance coverage that provided care outside of their training institution, a clearer picture of help seeking practices begins to emerge and why students are opting not to seek care. In addition, 68% of students indicated that confidentiality influenced their preference of off-site care for mental health issues, yet only 48% of students were aware of confidential services available off-site. In terms of students' knowledge of health-related confidentiality policies in the medical school, 22% of students were aware of a policy for general health issues while 20% were aware of a confidentiality policy for mental health issues. Students in the current study commented on their lack of knowledge around mental health services or resources available to them: "I think it would be important to have a lecture early in school year about mental health resources outside of the university for students who may feel uncomfortable going in school"; "I lack knowledge of programs available to students"; and "Opportunities to access mental health services should be advertised more effectively." These findings demonstrate, unequivocally, a general lack of awareness among students in the current study in terms of what services are available to address mental health needs, where they can be accessed, and what policies are in place to protect their confidentially. In addition, the high percentage of students favoring off-site mental health care highlights student concerns for stigma and perceived academic or career repercussions that may result from potential breaches of confidentiality (Roberts et al., 2000a, 2001). Students' discomfort with the dual role of student-patient may also influence student preference for offsite care, in particular for mental health issues (Moutier et al., 2009; Roberts et al., 2011).

Perceived Academic Jeopardy.

Medical student perceptions that health issues may impact academic status are a real concern for medical students and also influence their decision to seek care (Chew-Graham et al., 2003; Givens & Tjia, 2002; Kay et al., 2008; Midtgaard et al., 2008; Oppenheimer et al., 1987; Roberts et al., 2001). Health concerns cited in the current study which students felt would jeopardize academic status included: prescription drug use (85%), alcohol use (82%), HIV personal exposure (68.9%), other serious infections such as hepatitis and tuberculosis (61.2%), HIV training exposure (56.7%), depression (43.9%), anxiety (38.9%), cancer (31.6%) and marital or relationship problems (21.1%). Students commented voluntarily on these concerns in the open-ended section of the survey without prompting: "I think that the fear associated with getting care and not having it affect your medical school file, especially for mental illness, is a big concern. Students know that faculty discuss students and being in a small province often roles of specialists overlap with academic positions." These findings are consistent with the literature in terms of the high percentage of students who perceive academic jeopardy in relation to seeking care for stigmatizing illnesses (Dunn et al., 2008; Givens & Tjia, 2002; Kay et al., 2008; Midtgaard et al., 2008; Roberts et al., 2001). However, a rather surprising finding was that students perceived academic jeopardy in relation to a diagnosis of cancer, and marital or relationship problems. One explanation might be that students understood the question as a situation or illness that would affect their academic performance versus academic jeopardy pertaining to how they would be perceived by supervisors or faculty grading their performance. Alternatively, they may have fully understood the question but felt that being sick or unable to maintain a stable relationship might reflect on their ability to endure rigorous training or become a competent physician.

Dual Role of the Medical Student-Patient.

Medical student reluctance to proceed with the dual role as patient and student can act as an additional barrier to care, particularly if students require care at their training institution (Dunn et al., 2008; Roberts et al., 2011). In the current study, students were more likely to opt for an intermediate solution (self-diagnosing, seeking informal or off-site care, or delaying seeking care), or avoid the dual role of student-patient (not seeking care) for high stigma scenarios, and accept the dual role for low stigma issues or illnesses. Females were more likely to avoid the dual role if the health issue were embarrassing or pertaining to academic stress, and clinical students were more likely than preclinical students to avoid the dual role in high stigma scenarios. These findings suggest that medical students may perceive a cultural intolerance for any apparent 'weakness' in medical students or physicians who seek help from carers or other physicians who may be supervisors, colleagues, teachers and facilitators (Dunn et al., 2008; Roberts et al., 2011; Worley, 2008). Students commented on their experiences with the dual role in terms of how they felt they were treated by physicians who knew they were medical students: "Physician minimized my symptoms"; "I felt judgement from the physician." Additional comments reflect student concerns about being treated as a patient and not as a medical student: "As a medical student I am concerned that my personal physician might view me differently or perhaps expect me to know the answers to my own questions. I hope to be treated as a patient in the same way that non-health professionals are treated as patients"; and "Physicians should explore decision making process around tests etc. on a medical student as if they are not a medical student." Student responses also underscore their concerns for confidential care; in particular, for stigmatizing health issues given their patient records may be accessible to clinical teaching faculty: "Some physicians do not practice the confidentiality aspects that should be

followed." Concern around potential breaches of confidentiality which may impact their training or future career also provides insight into the practice of delaying or avoiding care for stigmatizing health issues (Dunn et al., 2008; Givens & Tjia, 2002; Moutier et al., 2009; Nuzzarello & Goldberg, 2004; Roberts et al., 2000b, 2011).

Reporting Impairment.

Medical students also indicated their reluctance to report an impaired colleague or student when the scenario presented had high stigma consequences for the impaired colleague. Male students were more likely to indicate reluctance to report impairment than female students. In addition, students were more likely to choose an intermediate solution in scenarios with either low or high stigma consequences, indicating their general reluctance to report impairment, no matter the consequences, and to find an alternative solution to assist the impaired colleague. An intermediate solution in the impairment vignettes was defined as a solution that did not involve medical school administration, documentation, and protected student anonymity. In general students were unaware of guidelines or policies around reporting impairment in a fellow student. In fact, only one student suggested reviewing guidelines on reporting impairment in relation to the vignette on student impairment. These findings reflect the culture in medicine around denial and minimization of illness or impairment, in part, because of a shared understanding of the negative consequences and punitive practices which are often the response to student or physician impairment (Center et al., 2003; Myers & Fine, 2003; Roberts et al., 2005; Thompson et al., 2001; Yiu, 2005). Punitive measures which have been documented in terms of the response to physicians with psychiatric disorders include discrimination in medical licensing, health and malpractice insurance, hospital privileges, and professional advancement (Centre et al., 2009; Thompson et al., 2001). The fallout from these punitive measures and the stigma

around the impaired student or physician reinforces the silence among medical students and contributes to their reluctance to seek help or to report an impaired colleague or peer.

Summary

In summary the medical students in the current study experienced clinically significant levels of distress far exceeding rates among age- and gender-matched peers in the general population. Factors that contributed to this distress reflected the negative impact of traditional, medical training and the socialization of medical students to deny or minimize illness, avoid seeking help through formal channels, in particular for stigmatizing health issues, and to develop inappropriate or harmful self-care practices which can potentially lead to impairment or long-term psychological consequences. These cultural practices are learned very early in medical training as evidenced in the current study and are perpetuated by way of the informal and hidden curriculum.

Study Strengths and Limitations

A particular strength of this study is that this research, using a measure of global distress and perceived stressors specific to the medical school environment, has not previously been conducted on the medical student population at the Canadian university under study. Research in this particular Atlantic province presents a unique opportunity to study barriers to help seeking due to the relatively small medical community and the challenge students and physicians face in terms of finding a care provider they do not know in a professional capacity. An important strength of this research, which was unique to the current study, was the utilization of Canadian Community Health survey data. This allowed for an appropriate comparison group in the general population and provided the contextual framework in which to explore psychological distress in the population under study. Another strength of this study was the use of multiple,

validated measures of distress as well as the exploration of distress and contributing factors, help-seeking practices, and barriers to care. In addition, the administration of the survey in a classroom setting, utilizing a convenience sample, enhanced the overall response rate (66%) as the majority of respondents were on site; however, the class which responded online had a much lower response rate, bringing the overall response rate down. Finally, an additional strength of this study was the interest and investment of the Faculty of Medicine in the results from the research which have practical and applied value in terms of addressing medical student distress and the negative impact of certain cultural practices in medicine.

One limitation of the current study may be related to the relatively small sample of third year medical students recruited. Use of an electronic survey for third year students who were largely offsite may have contributed to the small sample size and the unequal distribution in the classes which did not permit for definitive conclusions based on significance of training year differences in distress scores as measured on the K10. This is important given students in third year clerkship scored higher on the PMSS and described clerkship as particularly stressful with increased workload and responsibility, which may have also affected students' ability to participate in the study.

Issues related to surveying medical students identified previously (Levine, Breitkopf, Sierles, & Camp, 2003) may also have impacted current study results. These issues pertain to medical students' general mistrust that their responses will be kept anonymous resulting in low response rates or untruthful responses, despite the fact that student names and consent forms were not obtained. Additional issues pertain to student attitudes and concerns toward survey completion; namely, the invasion of privacy, fear of unwanted intervention, concern for academic reprisal, concern around not participating, stigma of mental illness, as well as potential

concern about the dual role of researchers affiliated with or employed by the medical school. As such, these findings may underestimate distress levels in the population under study.

Another possible limitation of the study pertains to the limited generalizability of the findings as the sample was limited to one medical school. Given the variability that exists across training institutions, differences in curricula and the training environment may be more, or less conducive to care-seeking among students at the school studied. The use of self-report instruments to measure medical student distress may also introduce potential bias as responses may not be accurate, or respondents may not fully understand questions being asked. In addition, some data was retrospective and thus may introduce recall bias.

The cross-sectional design of the study also limits the generalizability and interpretability of the findings as it does not support causal inferences in terms of the distress experienced by students and medical school variables (personal competence and endurance, training year, restrictions on social life, curriculum and environment factors) which accounted for a significant proportion of the variance (30%) in the study. However, the correlations established in the study identify relationships for future investigation. Another major issue with the cross sectional design pertains to cohort effects which may affect data used to compare differences across training year; in particular, differences in distress scores on the K10 or perceived stressors as assessed by the PMSS. Classes are not created equal; therefore, any differences in distress (K10) or perceived stress (PMSS) across training year may be the result of a cohort effect and not a training year effect. Ideally to understand training year effects, a longitudinal study to follow the same students over the entire period would provide more explanatory power.

Despite these limitations, overall the findings from this study add to and support current literature on the prevalence of medical student distress and contributing factors. Information on

prevalence and an understanding of factors which may contribute to medical student distress are critical to identifying students at risk and providing appropriate interventions. These preliminary findings serve to increase our understanding of cultural barriers to care for medical students and the stigma of mental health in medicine. As such, these findings can better inform prevention or reduction strategies to reduce the risk for negative health outcomes, assist in identifying appropriate resources to support medical student health, and aid in developing health promotion strategies to promote well-being in our medical schools.

Recommendations

Findings from this study have important implications for practice and policy related to curriculum-based and service-based components of Canadian medical education programs. These results create an impetus to address the stigma related to issues of mental health among medical students and faculty, the informal and hidden curriculum in our medical schools, and the resulting barriers to care experienced by medical students in need of mental health care and support. Prevention and stress reduction strategies to address the immediate issue of medical student distress should be the first priority for medical schools, including identifying students at risk and providing appropriate supports. Strategies to address medical student distress and avoidance of help seeking must include both individual and system-based solutions. Initiating an open dialogue among medical school administrators, faculty and students is essential to this process and an important first step in facilitating the cultural shift required to reduce medical student distress and to eliminate barriers to mental health care.

Despite evidence consistently indicating a high prevalence of psychological distress among medical students and the implications for serious personal and professional consequences, few studies have examined the efficacy of wellness programs in Canadian medical schools,

established in response to early calls for action on medical student distress. The Liaison Committee on Medical Education (LCME; 2014) currently requires schools to offer personal counselling to students and implement wellness programs as stipulated in Accreditation Standard MS-26 (12.3); however, guidelines or best practices in terms of what these programs should include have not been established. Wellness programs currently focus on health promotion activities such as increased exercise, sleep, better nutrition, and stress management techniques (Dyrbe et al., 2005). Yet there is little empirical evidence which demonstrates that these approaches are effective in preventing or reducing psychological distress in medical students. Contributing to the ineffectiveness of these approaches, may be the focus on individual solutions which do not address the system-based factors that contribute to and perpetuate medical student distress and inappropriate self-care practices (Dyrbe et al., 2005; Hughes et al., 1991; Kay et al., 2008; Dyrbe et al., 2006; Schwenk et al., 2010). As evidenced in the current study, distress levels were clinically significant despite the existence of an established wellness program in this Medical education program. Students consistently cited system-based factors as both contributing to their distress and creating barriers to care.

Individual approaches which should be considered in conjunction with system-based approaches to address medical student distress include: identifying students at risk early in their training; teaching students to self-identify and recognize symptoms of distress; teaching students techniques for reducing distress (Dyrbe et al., 2005; Roberts et al., 2011); implementing evidence-based health promotion and prevention strategies to promote student well-being and prevent burnout among medical students such as stress management (Dyrbe et al., 2005); educating students on available services and programs (Dyrbe et al., 2005, Roberts et al., 2011); teaching self-reflection (Voltmer, Rosta, Assland, & Sphan, 2010); and finally, promoting

resilience (Canadian Medical Association, 2010; Montgomery et al., 2011). The limitations of some of these approaches relate to the focus on individual factors or solutions which excludes contextual and environmental factors. A more effective approach would involve implementation of individual solutions in conjunction with a system-based approach.

System-based approaches to combat medical student distress would need to involve ground level changes to the training culture, the curriculum, student evaluation methods, student service programs, and administration processes and policies (Dyrbye et al., 2006; Roberts et al., 2000a). Addressing the hidden curriculum which teaches students to adopt unrealistic expectations of themselves, models excessive self-reliance, and perpetuates the stigma of mental illness is of critical importance (Hafferty, 1998; Kay et al., 2008; Mahood, 2011; Miller & Mcgowen, 2000; Pitkala & Mantyranta, 2003; Thompson et al., 2001). Structural approaches require improving access to care through well-advertised services which are readily available, confidential, and coincide with free time in the students' schedules. This would involve addressing schedule constraints and reducing long working hours for clerks and residents. In order to address student concerns with confidentiality, medical schools need to ensure students can avail of protected avenues of care without fear of documentation on their student file. Student personal files should be maintained separately from academic files while overlap should be avoided in terms of faculty teaching, administrative, and care-providing roles (Cohen et al., 2008; Givens & Tjia, 2002; Roberts et al., 2000a, 2011).

Implications for curriculum-based change include the introduction of content pertaining to student or physician impairment, vulnerability to illness, obligations to report impairment, stigma associated with mental health and/or mental health care, and the potential consequences of silence (Roberts et al., 2005). In addition, inclusion of personal and professional development

in curriculum-based content could cover appropriate self-care practices, adaptive coping strategies and mentoring skills (Spencer, 2005). Student assessment methods should be reviewed to ensure students are being assessed on knowledge, skills and performance and not on past or current health or mental health issues, particularly in the case of high-stake judgments such as residency acceptance as these factors can negatively influence the outcome for students. As well, assessment based on a pass/fail grading system would reduce student competiveness and has been shown to foster a more positive learning environment (Reed et al., 2011). Until recently, evaluation methods in medical schools based on multi-tiered grading systems promoted competiveness among medical students with the unintended effect of fostering individualism and a more stressful learning environment (Spring, Robillard, Gehlbach, & Simas, 2011).

In terms of program-based changes, the current study highlights the importance of efficacious wellness programs, inclusion of stress rounds (mandatory, faculty-led sessions on stress management), access to offsite mental health services, well publicized access to services, financial coverage for clinical psychologists or counsellors, and more flexibility in curriculum or training schedules (Rosenthal & Okie, 2008). In addition to these program or service changes, medical schools also need to develop safeguards for the confidentiality of students accessing information, support or intervention, and clear protocols for assessing illness and impairment, as well as ensuring that records related to accessing mental health services are kept separate from academic records to prevent or reduce breaches of confidentiality (Roberts et al., 2005).

Implications for policy include the development of policies around student wellness and impairment and appropriate administrative processes which strike a balance between determining impairment, ensuring treatment, and maintaining student confidentiality. Ensuring these policies are transparent and adhered to accordingly can help to alleviate students concerns around

breaches of confidentiality and perceptions of academic jeopardy in relation to illness or impairment (Roberts et al., 2001; Givens & Tjia, 2002; Roberts et al., 2000; Schwenk et al., 2010). In addition, statements relating to medical student illness, safeguards for care, and evaluation of performance need to be clear and transparent. Explicit policies on reporting impairment also need to formalized (Roberts et al., 2005). Ultimately, these changes can only be effective if teaching physicians and medical school administrators model appropriate care practices for students.

In summary, a more comprehensive approach to our understanding of medical student distress that acknowledges and systematically addresses any negative influences of the medical school environment, culture and curriculum, and student perceptions of competence and endurance while ensuring appropriate supports are in place may foster a culture of caring in medicine and ultimately reduce the negative impact of medical training on the psychosocial and physical health of medical students (Center et al., 2003; Davidson & Schattner, 2003; Dunn et al., 2008; Dyrbe et al., 2006; Thompson et al., 2001).

Future Research

Future research on medical student distress should expand on the current sample to include residents and physicians from across Canada. As well, a follow up study could build on the current study and explore individual predictors of distress (e.g. personality traits, coping styles, social support, resilience etc.) to account for the variability of responses not explained by factors explored. A longitudinal study design over the entire training period to ascertain trends or patterns of distress, help seeking behaviours, self-care practices, and medical school stressors on transition through medical school to residency and practice, would enhance our knowledge of the long-term effects and consequences of distress in medical school and help in identifying

causality between predictors and outcomes by increasing the explanatory power of the analyses. Further exploration of medical student well-being, resilience and coping mechanisms would also enhance the current study findings and provide additional insight into the variability noted.

Finally, effectiveness studies to assess current prevention and intervention strategies would inform the development of appropriate solutions for addressing medical student distress. A qualitative or mixed-method study design could be employed to explore the efficacy of current wellness programs and expand on the current study findings. This might involve document analyses to review practices and policies around medical student well-being and impairment. Interviews with medical students, faculty, and administrators would further inform findings from the current study to explore individual student experiences of distress and the socialization of medical students to medical school training and culture. This research would improve our understanding of how the informal and hidden curriculum perpetuates stigma and impacts student well-being and help-seeking practices.

Dissemination Plan

Dissemination of findings initiated with a presentation of the current study results in the Community Health Graduate Seminar Series and the Psychology Colloquium Graduate Seminar Series. Upon review and final resubmission of the thesis, a summary report will be prepared and submitted to the Dean of Medicine, the Assistant Deans of Undergraduate Medical Education, Post Graduate Medical Education, Student Affairs, and the Student Wellness Group. Additional presentations have been scheduled this month for the participants involved in the study including Medical Grand Rounds to target a wider audience in medicine. A poster presentation has been confirmed for the Primary Healthcare Partnership Forum - PriFor 2015 and will also be presented at Psychiatry Research Day. Finally, dissemination will also include submission of an

article(s) for publication to the following peer-reviewed journals: CMAJ, Soc Sci & Med, CJPH, Med Ed, Can Fam Phys, AJPH etc.

Chapter 6: Conclusion

Medical Student Distress

Medical students report higher levels of psychological distress than age-matched peers in the population (Dyrbe et al., 2006). Despite the high prevalence of psychological distress among medical students and their reported concerns related to help seeking barriers, mental health services, curriculum, and care processes have been slow to change in addressing these issues (Estabrook, 2008). In the recent past, the development of a strategic plan to support the mental health of Canada's doctors was the focus of the Canadian Medical Association in conjunction with the Mental Health Commission of Canada (Silversides, 2008). Research has consistently demonstrated that physician impairment has its origins in medical school, yet research on medical student distress, contributing factors, and help-seeking practices in Canada is limited (Cohen et al., 2008; Dyrbe et al., 2006).

This research provided information on the prevalence of psychological distress among a population of medical students at an Atlantic Canadian university in comparison to age-matched peers in the general population. The study also provided key information on perceived stressors and potential barriers to care in relation to the personal health care needs, concerns, and practices of a population of medical students in one Atlantic province. Findings from the research highlight the stigma associated with help-seeking for mental health issues or other stigmatizing illnesses, and reflect the culture of medicine and the hidden curriculum in our medical schools. The small population of the province presents additional challenges to students and physicians in terms of obtaining care from physicians they do not encounter in an academic or professional capacity, including professionals outside their training institution.

Factors Contributing to Medical Student Distress

Factors which contributed to distress in the medical student population under study pertained mainly to the curriculum environment, academic pressures, perceived competence and endurance, and social issues which varied by gender and training year. Perceived personal competence and endurance was identified as a key stressor and is typically associated with depressive symptoms, anxiety and generalized psychological distress (Chandavarkar et al., 2007). In a study by Midtgaard et al. (2008), student perceptions of their own personal competence and endurance predicted later mental health problems severe enough to require treatment. In the current study, personal competence and endurance was a key predictor of medical student distress with 7% of students in the sample reporting severe psychological distress. The perception that medical school interfered with social support and time for recreational activities was identified as an additional stressor by the majority of students. Training year differences in perceived stressors indicated that third year students experienced higher levels of perceived stress in relation to the training environment, personal competence and endurance, and interference with social life.

Health Needs, Practices and Barriers to Care

Medical students indicated specific health needs and concerns, yet reported health practices that demonstrated their reluctance to seek appropriate care, in particular, for more stigmatizing health issues. When students did seek help, they indicated a preference for offsite care, informal consultation, and self-care. Self-care practices reported by students included avoiding or delaying care, alcohol abuse, and drug use, including use of both recreational and prescription drugs. Barriers to care identified in the study reflected issues related to stigma and the medical school culture or environment which is consistent with the findings in the literature

(Center et al., 2003; Hooper et al., 2005; Roberts et al., 2000a). The barriers cited by students included: schedule constraints, difficulty accessing care, concern for confidentiality, fear of stigma, concern with the dual role of student-patient, perceived academic vulnerability, and the lack of familiarity with mental health resources and policies.

Increasing levels of distress across training year coupled with the increased responsibility of clinical training and practice, longer working hours, decreased time for social relationships or recreational activities and a culture of self-denial and excessive self-reliance is a scenario which potentially sets students up for long-term, negative health consequences. Overall the findings from this study highlight the importance of acknowledging negative aspects of the medical school training environment, such as the unrealistic expectations which can lead to student perceptions of incompetence, long working hours and degree of responsibility which increases across level or year of training, and the decreased time for social relationships or recreational activities; the stigma of mental illness in medicine; the informal and hidden curriculum; and students' ability to navigate the process of enculturation into medicine as both sources of distress and barriers to care (Center et al., 2003, Dyrbe et al., 2005; Hafferty, 1998; Hooper et al., 2005, Vitaliano et al.,1989).

Medicine and the Stigma of Mental Illness

Stigma has been cited as a key barrier to medical student help-seeking for mental health issues due to perceptions of academic vulnerability (Givens & Tjia, 2002; Midtgaard et al., 2008; Roberts et al., 2000a, 2005) and is reported to be endemic to medical school culture (Adams, Lee, Pritichard, & White, 2010; Thompson et al., 2001). Medical culture is characterized by an intolerance of uncertainty which contributes to individual experiences of personal inadequacy and fear of failure (Baret, 2011; Benbassat et al., 2011). The culture of self-denial and self-

reliance in medicine compounded by unrealistically high expectations of competence, deemed necessary for medical education and practice, exacerbates the effects of stigma and negatively impacts medical student well-being and impedes any efforts or intentions to seek help for mental health issues (Clode, 2004; Centre et al., 2003; Chew-Graham et al., 2003; Davidson & Schattner, 2003; Seritan et al., 2012; Thompson et al., 2001; Worley 2008).

Consistent with the literature, the current study demonstrated that medical students were reluctant to seek help for mental health issues and avoided or delayed care. Both the current study and the literature reveal that fear of stigma attached to psychiatric treatment or diagnoses, perceived academic vulnerability and the perceived lack of confidentiality act as barriers to seeking help through formal means (Givens & Tjia, 2002; Midtgaard et al., 2008; Roberts et al., 2000a, 2001; Schwenk et al., 2010). The literature suggests that medical students internalize the stigma and express feelings of shame and embarrassment in admitting what they perceive as weakness (Roberts et al., 2000b), fear confiding in a tutor, fear the problem will not be treated confidentially, and express concern that admitting to a problem will affect their future career (Chew-Graham et al., 2003).

The Informal and Hidden Curriculum

Understanding the acculturation of medical students is fundamental to our appreciation of student attitudes toward help seeking, and where, when, and how medical students seek help (Hooper et al., 2005; Roberts et al., 1996, 2000a; Thistlewaite et al., 2010). Medical students are socialized to medical culture and practices throughout their medical education and clinical training (Mahood, 2011; Pitkala & Mantyranta, 2003). The informal and hidden curriculum provides the means for transmitting some aspects of medical culture and highlights an important disconnect in terms of what students are explicitly taught in the classroom and what they

implicitly learn in the corridors and locker rooms of the medical school and the practice sites. The informal curriculum occurs at the level of individual and interpersonal interactions, and includes knowledge acquired by medical students outside formally allocated learning environments including the classroom, lab, and patients' bedside (Hafferty, 1998), including attitudes toward mental illness (Hooper et al., 2005; Roberts et al., 1996, 2000a, 2001; Thistlewaite, Quirk, & Evans, 2010). The hidden curriculum is embedded in the hierarchical structure and organization of medicine, and can be found among commonly held beliefs, practices, and cultural 'understandings', such as the stigma associated with mental illness, and the customs, rituals, and taken-for-granted aspects of medical education and medical student life. These beliefs, practices and understandings structure medical schools as cultural, moral communities that shape medical education and training and construct essentialist ideologies of what is good or bad medicine, and what is acceptable or unacceptable practice (Hafferty, 1998; Mahood, 2011).

The formal curriculum stresses the importance of professionalism, empathy, collaborative and ethical practice, equity and collegiality; in contrast, the informal and hidden curriculum reinforces acceptance of the hierarchical structure and authoritative nature of medicine, the importance of assuming the physician identity, and the importance of emotional detachment, which can negatively impact student and physician idealism, compassion, and ethical and professional integrity (Gaufberg, Batalden, Sands, & Bell, 2010; Lempp & Seale, 2004). As such, medical education becomes more than a transmission of knowledge and skills, but rather, a socialization process whereby norms and values of medical culture are transmitted which may undermine the formal, stated values of the medical profession (Mahood, 2011; Pitkala & Mantyranta, 2003).

Stigma and the Informal/Hidden Curriculum

The stigma associated with the mentally ill medical student or physician is transmitted through the informal and hidden curriculum, undermining core values of the formal curriculum, and contributes to avoidance of help seeking and inappropriate self-care practices (Chew-Graham et al., 2003; Hooper et al., 2005; Roberts et al., 2000a; Hafferty, 1998). The socialization process of medical students to the culture and practices of medicine through the classroom and clinical training environment contributes to high levels of stress and anxiety among medical students (Mahood, 2011; Pitkala & Mantyranta, 2003), with potential, long-term mental health consequences, while simultaneously creating barriers to care (Hooper et al., 2005; Roberts et al., 2000a). As evidenced in the current study, this can have negative mental health consequences and create barriers to care. Yet, despite disturbingly high levels of distress and the manifestation of various mental health issues among medical students, they are reluctant to seek help through formal channels.

The fear of stigma associated with psychiatric treatment or diagnoses is particularly heightened in medicine and functions as a principle barrier to medical student help seeking (Chew-Graham et al., 2003; Roberts et al., 2000). Negative attitudes associated with mental illness are extremely prevalent in medicine (Dixon, Roberts, Lawrie, Jones, & Humphreys, 2008; Dunn, Green Hammond, & Roberts, 2009) and function to discourage medical students from acknowledging perceived health vulnerabilities (Center et al., 2003). The stigmatization of psychiatry by other disciplines in medicine (Fischel, Manna, & Krivoy, 2008; Syed, Siddiqi, & Dogar, 2008) solidifies the stigma experienced by students, perpetuates the negative attitudes and belief systems around mental illness, and ultimately functions to both structure and reproduce the culture of silence around mental illness amongst physicians. Students in the current study

commented freely on stigma and barriers they experienced to care reflective of the hidden curriculum. It is important to note that these comments were unprompted and were not cued by specific questions in the survey. Rather, students included their comments in the open-ended question at the end of the survey which asked them if they had any additional comments they would like to include in relation to accessing care. For instance, one student commented: "Even though health professionals talk about mental illness - the stigma and discrimination is still present. Mental illness is NOT seen as being equal to illnesses such as cancer and diabetes, though it should be." Another student alluded to the cultural transmission of stigma in medicine: "Mental health continues to have a huge stigma in medical facilities, despite the understanding that it is no different from any physical condition. We need to address this misinformation and ensure stereotypes are no longer perpetuated in the classroom and in the clinic."

Medical culture and the process of enculturation to medicine is fundamental to our understanding of the fear and the silence -- why so many medical students get sick and why they are not seeking help (Radcliffe & Lester, 2003; Seritan et al., 2012; Sinclair, 1997; Thompson et al., 2001; Worley, 2008). In closing, I would like to share what one student referred to as their 'rant' on the distress seemingly inherent to medical training and the curriculum environment:

> I am very happy that someone is doing a research project on medical student distress. Starting medical school was a huge shock to me…and the learning environment - no rapport with lecturers/preceptors as there is a different lecturer/preceptor for almost every lecture/week of clerkship, and constantly being surrounded by anxious, type A, high achievers (and being one too) - were a huge let down and a great source of stress to me. It felt a lot like being back in high school... I like to call medical school the adolescence of my career; I feel lost and confused most of the time, I feel like I don't fit in with my

peers, and I wonder where I'm going to end up at the end of the road. I'm only starting to realize now that maybe I'm not the only one who feels this way... Unfortunately there doesn't seem to be an open dialogue about this kind of distress, other than "oh my god I'm so stressed out" and "oh my god, me too." It's almost like because we are all in the same boat, we can't really complain to each other much more than that, and the only comfort we can offer one another is "I know, me too" (and a lot of students won't even admit to that much!). If distress in medical school or clerkship is such a common problem, then why are students, year after year, still put in a position where many are silently suffering? There has to be a better way…a student-centered way.

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Table 1. *Medical Student Participant Sample Characteristics*

	N=181 (%)	Male N=72 (%)	Female N=107 (%)
Age (Years)			
≤ 24	66 (36.7)	20 (30.0)	46 (70.0)
25-29	98 (54.4)	43 (44.0)	54 (56.0)
30-34	12 (6.7)	6 (50.0)	6 (50.0)
35-39	1 (0.6)	0 (0.0)	1 (0.1)
40-44	2 (1.1)	2 (1.0)	0 (0.0)
Marital Status			
Married	23 (12.8)	10 (45.0)	12 (55)
Single	154 (85.6)	61 (40.0)	93 (60)
Divorced/Separated	3 (1.7)	1 (33.0)	2 (67)
Children			
Have children	8 (4.4)	6 (75.0)	2 (25)
Do not have children	172 (95.6)	66 (39.0)	105 (61)
Place of Upbringing			
Rural	78 (43.3)	32 (42.0)	45 (58)
Urban	102 (56.7)	40 (40.0)	62 (61)
Training Year			
Year 1	62 (34.4)	25 (40.0)	37 (60)
Year 2	45 (25.0)	21 (47.0)	24 (53)
Year 3	22 (12.2)	12 (55.0)	10 (45)
Year 4	51 (28.3)	14 (28.0)	36 (72)

Table 2. *Gender and Training Year Mean Score Differences on the Kessler Distress Scale (K10) by Demographics*

	N=181 (%)	K (10) Total Scores M (SD)	K(10) 25-29 N = 18 M (SD)	K(10 30-50) N = 13 M (SD)
Age (Years)				
< 24	66 (36.7)	20.5 (6.3)	26.3 (1.4)	32.1 (2.3)
25-29	98 (54.4)	18.1 (5.0)	25.8 (1.2)	34.5 (6.4)
30-34	12 (6.7)	17.6 (4.6)	-	31.0 (0.0)
35-39	1 (.6)	21.0 (0)	-	-
40-44	2 (1.1)	16.0 (7.1)	-	-
Gender				
Female	107 (59.4)	19.6 (5.8)*	25.8 (1.2)	32.8 (3.2)
Male	72 (40.0)	17.9 (5.1)*	26.2 (1.6)	31.0 (1.0)
Marital Status				
Married	23 (12.8)	18.3 (5.9)	25.8 (1.0)	30.5 (0.7)
Single	154 (85.6)	19.0 (5.6)	26.0 (1.4)	32.7 (3.0)
Divorced/Separated	3 (1.7)	15.7 (4.6)	-	-
Children				
Have children	8 (4.4)	20.3 (6.3)	27.0 (0.0)	31.0 (0.0)
Do not have children	172 (95.6)	18.9 (5.6)	25.9 (1.3)	32.5 (3.0)
Place of Upbringing				
Rural	78 (43.3)	18.4 (5.4)	26.0 (1.5)	31.8 (1.9)
Urban	102 (56.7)	19.4 (5.7)	25.9 (1.2)	32.8 (3.4)
Training Year				
Year 1	62 (34.4)	19.4 (5.8)	26.4 (1.7)	34.0 (3.8)
Year 2	45 (25.0)	20.0 (6.1)*	26.4 (1.5)	32.0 (1.9)
Year 3	22 (12.2)	19.9 (6.1)	25.3 (0.5)	30.3 (0.6)
Year 4	51 (28.3)	17.0 (4.2)*	25.5 (0.6)	-

*Significant at $p < .05$

Note: K(10) 25-29 range indicates moderate to strong distress levels; K(10) 30-50 range indicates severe levels of distress. The K(10) maps onto anxiety and depression scales (Andrews & Slade, 2001).

Table 3. *Gender and Training Year Mean Score Differences on the Perceived Medical School Stressor (PMSS) Subscales by Demographics and Distress Levels (K10)*

	Medical school curriculum/ environment M (SD)	Social Life/ Recreation M (SD)	Personal Competence/ Endurance M (SD)	Financial Concerns M (SD)	Accommodation Concerns M (SD)
Age (Years)					
≤ 24	7.9 (3.6)	2.2 (1.1)	9.3 (3.8)	2.5 (1.3)	1.5 (1.1)
25-29	8.0 (3.9)	2.1 (1.1)	7.8 (3.7)	2.6 (1.1)	1.5 (1.3)
30-34	9.3 (3.3)	2.2 (.9)	8.8 (3.2)	3.0 (1.0)	1.8 (1.0)
35-39	8.0 (0.0)	3.0 (0.0)	9.0 (0.0)	1.0 (0.0)	0.0 (0.0)
40-44	7.5 (0.7)	2.0 (0.0)	8.0 (0.0)	1.5 (2.1)	1.0 (1.4)
Gender					
Female	8.0 (3.7)	2.3 (1.1)*	9.0 (3.5)**	2.8 (1.1)*	1.6 (1.2)
Male	8.0 (3.8)	1.9 (1.1)*	7.4 (3.7)*	2.3 (1.3)*	1.3 (1.1)
Marital Status					
Married	8.8 (3.5)	2.3 (1.0)	9.0 (3.6)	2.6 (1.2)	1.3 (1.3)
Single	8.0 (3.8)	2.1 (1.1)	8.4 (3.7)	2.6 (1.2)	1.6 (1.2)
Divorced Or Separated	6.0 (1.0)	1.7 (0.6)	8.0 (0.0)	3.0 (1.0)	1.0 (1.0)
Children					
Have children	8.0 (2.1)	2.1 (0.8)	9.5 (2.3)	2.4 (1.3)	1.1 (1.2)
No children	8.0 (3.8)	2.2 (1.1)	8.4 (3.7)	2.6 (1.2)	1.5 (1.2)
Place Upbringing					
Rural	7.8 (3.7)	2.1 (1.1)	8.3 (3.8)	2.7 (1.2)	1.6 (1.2)
Urban	8.2 (3.8)	2.2 (1.1)	8.6 (3.6)	2.5 (1.2)	1.4 (1.2)
Training Year					
Year 1	7.1 (3.3)	2.0 (1.0)	8.2 (3.7)	2.6 (1.2)	1.3 (1.2)
Year 2	8.0 (4.0)	2.2 (1.2)	8.7 (3.6)	2.2 (1.2)	1.4 (1.1)
Year 3	11.1 (3.8)**	2.7 (1.2)*	10.6 (4.1)*	2.9 (1.2)	2.2 (1.3)*
Year 4	8.0 (3.3)	2.0 (1.1)	7.5 (3.3)	2.8 (1.1)	1.6 (1.2)
Kessler (K10)	8.0 (3.7)**	2.2 (1.1)**	8.4 (3.7)**	2.6 (1.2)	1.5 (1.2)

* Significant at $p < .05$

** Significant at $p < .001$

Table 4. *Gender and Training Year Differences by Level of Distress (K10) and Perceived Stressors (PMSS)*

	N=181 (%)	K (10) Total Scores M (SD)	PMSS Total Scores M (SD)
Age (Years)			
≤ 24	66 (36.7)	20.5 (6.3)	21.3 (7.4)
25-29	98 (54.4)	18.1 (5.0)	20.4 (8.3)
30-34	12 (6.7)	17.6 (4.6)	23.1 (5.2)
35-39	1 (.6)	21.0 (0)	18.0 (0.0)
40-44	2 (1.1)	16.0 (7.1)	18.0 (4.2)
Gender			
Female	107 (59.4)	19.6 (5.8)*	21.6 (7.5)*
Male	72 (40.0)	17.9 (5.1)*	19.6 (7.9)*
Marital Status			
Married	23 (12.8)	18.3 (5.9)	22.0 (7.2)
Single	154 (85.6)	19.0 (5.6)	20.8 (7.9)
Divorced/Separated	3 (1.7)	15.7 (4.6)	17.7 (3.1)
Children			
Have children	8 (4.4)	20.3 (6.3)	20.9 (5.6)
Do not have children	172 (95.6)	18.9 (5.6)	20.9 (7.8)
Place of Upbringing			
Rural	78 (43.3)	18.4 (5.4)	20.8 (8.3)
Urban	102 (56.7)	19.4 (5.7)	21.0 (7.3)
Training Year			
Year 1	62 (34.4)	19.4 (5.8)	19.4 (7.4)
Year 2	45 (25.0)	20.0 (6.1)*	20.7 (7.9)
Year 3	22 (12.2)	19.9 (6.1)	27.1 (7.0)**
Year 4	51 (28.3)	17.0 (4.2)*	20.2 (7.2)

* Significant at $p < .05$
** Significant at $p < .001$

Table 5. *Frequency of Perceived Medical School Stressors (PMSS) Endorsed by Students*

	Frequency N=181 (%)
1. Fosters anonymity and feelings of isolation	20 (11.2)
2. Long hours responsibilities clinical training	61 (33.9)
3. Don't know faculty/administration expect of me	43 (23.8)
4. Controls my life leaves little time for other activities	74 (41.2)
5. Mastering pool of medical knowledge	112 (62.2)
6. Fosters physician role expense of one's personality and interests	46 (25.5)
7. More competitive than expected	32 (17.8)
8. Attitude faculty students subjected to 'baptism of fire'	43 (23.9)
9. Success in medical school is in spite of the administration	69 (38.4)
10. Cold impersonal bureaucratic	20 (10.6)
11. More threat than challenge	12 (6.7)
12. Personal financial concern	115 (63.9)
13. Accommodations concern	50 (27.7)

Table 6. *Model Summary for Predictors of Medical Student Distress*

Model	b	*SE-b*	Pearson r	sr^2	*p* value
(Constant)	13.509	1.177			.000
Personal Competence and Endurance	.622	.121	.508	.048	.000**
Training Year	-.689	.294	-.171	.118	.020*
Social Life and Recreation	.812	.407	.398	.022	.048*

Note: The dependent variable was level of psychological distress measured by the Kessler (K10).

R^2 = .295, Adjusted R^2 = .283. sr^2 is the squared semi-partial correlation.

* Significant at $p < .05$
** Significant at $p < .001$

Table 7. *Frequency of Responses on Medical Student Health Needs by Training Year and Gender*

	Frequency N=181 (%)	Training Year		Gender	
		Preclerkship N=107 (%)	Clerkship N=73 (%)	Male N=72 (%)	Female N=107 (%)
Health maintenance	117.0 (65.0)	60 (56.1)	27 (37.0)	35 (48.6)	81 (75.7)
Cold or flu symptoms	76.0 (42.2)	38 (35.5)	38 (52.1)	23 (31.9)	52 (48.6)
Other infections	46.0 (25.6)	24 (22.4)	22 (30.1)	15 (20.8)	31 (29.0)
Vaccination (e.g. flu, hepatitis)	115.0 (63.9)	64 (59.8)	51 (69.9)	40 (55.6)	74 (69.2)
Fatigue	51.0 (28.3)	31 (29.0)	20 (27.4)	15 (20.8)	35 (32.7)
Gastrointestinal complaints	35.0 (19.4)	19 (17.8)	16 (21.9)	14 (19.4)	20 (18.7)
Headaches	43.0 (23.9)	25 (23.4)	18 (24.7)	9 (12.5)	33 (30.8)
Pregnancy-related	4.0 (2.2)	1 (0.9)	3 (4.1)	1(1.4)	3 (2.8)
Anxiety	43.0 (23.9)	24 (22.4)	19 (26.0)	14 (19.4)	28 (26.2)
Depression	20.0 (11.1)	11 (10.3)	9 (12.3)	4 (5.6)	16 (15.0)
Pain	19.0 (10.6)	16 (15.0)	3 (4.1)	4 (5.6)	15 (14.0)
Stress	51.0 (28.3)	31 (29.0)	20 (27.4)	17 (23.6)	33 (30.8)
Problems with Eating	18.0 (10.0)	6 (5.6)	12 (16.4)	7 (9.7)	11 (10.3)
Injury	24.0 (13.3)	16 (15.0)	8 (11.0)	9 (12.5)	15 (14.0)
Alcohol problems	4.0 (2.2)	2 (1.9)	2 (2.7)	4 (5.6)	0 (0.0)
Other drug problems	1.0 (0.6)	1 (0.9)	0 (0.0)	1 (1.4)	0 (0.0)
Prescription drug problems	3.0 (1.7)	1 (0.9)	2 (2.7)	1 (1.4)	2 (1.9)
Chest pain	3.0 (1.7)	1 (0.9)	2 (2.7)	1 (1.4)	1 (0.9)
HIV testing (personal exposure)	5.0 (2.8)	3 (2.8)	2 (2.7)	2 (2.8)	3 (2.8)
HIV testing (exposure in training setting)	7.0 (3.9)	3 (2.8)	4 (5.5)	3 (4.2)	4 (3.7)
Elective surgery	7.0 (3.9)	4 (3.7)	3 (4.1)	1 (1.4)	6 (5.6)
Cancer	0.0 (0.0)	0 (0.0)	0 (0.0)	0 (0.0)	0 (0.0)
Other	17.0 (9.4)	9 (.08)	8 (.12)	6 (.08)	11 (.10)

Table 8. *Frequency of Responses on Medical Student Site of Preference for Health Care*

	At Training Institution N=181 (%)	Outside Training Institution N=181 (%)
Health maintenance	115 (63.5)	65 (35.9)
Cold or flu symptoms	134 (74.0)	46 (25.4)
Other infections	107 (59.1)	73 (40.3)
Vaccination (e.g. flu, hepatitis)	148 (81.8)	32 (17.7)
Fatigue	98 (54.1)	82 (45.3)
Gastrointestinal complaints	104 (57.5)	76 (42.0)
Headaches	112 (61.9)	68 (37.6)
Pregnancy-related	66 (36.5)	114 (63.0)
Anxiety	44 (24.3)	136 (75.1)
Depression	40 (22.1)	140 (77.3)
Pain	101 (55.8)	79 (43.6)
Stress	60 (33.1)	120 (66.3)
Problems with Eating	35 (19.3)	145 (80.1)
Injury	117 (64.6)	63 (34.8)
Alcohol problems	29 (16.0)	151 (83.4)
Other drug problems	31 (17.1)	149 (82.3)
Prescription drug problems	32 (17.7)	148 (81.8)
Chest pain	118 (65.2)	62 (34.3)
HIV testing (personal exposure)	31 (17.1)	149 (82.3)
HIV testing (exposure in training setting)	88 (48.6)	92 (50.8)
Elective surgery	93 (51.4)	87 (48.1)
Cancer	95 (52.5)	85 (47.0)

Table 9. *Gender and Training Year Differences on Frequency of Responses to Medical Students' Needs, Barriers and Access to Health Care*

	Training Year		Gender	
	Preclerkship N=107 (%)	Clerkship N=73 (%)	Female N=107 (%)	Male N=72 (%)
Need or want health care	91 (85.0)	64 (87.8)	98 (91.6)*	56 (77.8)*
Day surgery/outpatient procedure	13 (12.1)	16(21.9)	21 (19.6)	7 (9.7)
Overnight hospitalization	2 (1.9)	1 (1.4)	2 (1,8)	1 (1.4)
Aware of health insurance for counselling services	27 (25.2)	27 (37.0)	28 (26.2)	26 (36.1)
Perceive that insurance requires treatment at training institution	90 (84.1)	62 (84.9)	92(86.0)	59 (81.9)
Prefer coverage outside training institution	89 (83.2)	60 (82.2)	96 (89.7)*	52 (72.2)*
Care received at training institution	46 (43.0)	39 (53.4)	56 (52.3)	29 (40.3)
Care received outside institution	72 (67.3)	48 (65.8)	74 (69.2)	45 (62.5)
Confidentiality concerns influence preference	71 (66.4)	51 (69.9)	73 (68.2)	48 (66.7)
Aware confidential mental health services available off site	54 (50.5)	32 (43.8)	53 (49.5)	33 (45.8)
Aware confidentiality health policy	21 (19.6)	18 (24.7)	20 (18.7)	19 (26.4)
Aware confidentiality policy mental health	17 (15.9)	19 (26.0)	19 (17.8)	17 (23.6)
Difficulty getting health care	42 (39.3)*	42 (57.8)*	60 (56.1)*	19 (26.4)*
Too busy to take time off	37 (34.6)	42 (57.8)	60 (56.1)	18 (25.0)
Did not have access to care	4 (3.7)	4 (5.5)	6 (5.6)	2 (2.8)
Excessive waiting to be seen	18 (16.8)	14 (19.2)	26 (24.3)	6 (8.3)
Worried about confidentiality	10 (9.3)	6 (8.2)	12 (11.2)	4 (5.6)
Some other reason	2 (1.9)	2 (2.7)	3 (2.8)	1 (1.4)
Did not seek care for problems	53 (49.5)	42 (57.5)	60 (56.1)	34 (47.2)
Too busy to take time off	46 (43.0)	38 (52.1)	56 (52.3)	27 (37.5)
Worried about cost	2 (1.9)	1 (1.4)	3 (2.8)	0 (0.0)
Did not have access to care	4 (3.7)	4 (5.5)	7 (6.5)	1 (1.4)
Excessive waiting to be seen	18 (16.8)	11(15.1)	23 (21.5)	5 (6.9)
Worried about confidentiality	8 (7.5)	5 (6.8)	10 (9.3)	3 (4.2)
Other reason	6 (5.6)	6 (8.2)	6 (5.6)	6 (8.3)
Informal consultation sought	21 (19.6)	33 (45.2)	38 (35.5)	17 (23.6)
Perform physical exam	42 (39.3)	38 (52.1)	51 (47.7)	28 (38.9)
Diagnose symptoms	21 (19.6)	33 (45.2)	36 (33.6)	17 (23.6)
Order or interpret lab tests	1 (0.9)	3 (4.1)	1 (0.9)	3 (4.2)
Prescribe medications	2 (1.9)	6 (8.2)	4 (3.7)	4 (5.6)
Perform other medical care	3 (2.8)	1 (1.4)	3 (2.8)	1 (1.4)
Reason for informal medical care				
Convenient or accessible	44 (41.1)	46 (63.0)	60 (56.1)	29 (40.3)
Takes less time	34 (31.8)	37 (50.7)	42 (39.3)	28 (38.9)
Less expensive	2 (1.9)	1 (1.4)	1 (0.9)	2 (2.8)
Protects confidentiality	2 (1.9)	5 (6.8)	4 (3.7)	3 (4.2)
Other reason	6 (5.6)	9 (12.3)	10 (9.3)	5 (6.9)

* Significant at $p < .05$

Table 10. *Frequency of Responses on Medical Student Concerns for Developing Health or Personal Problems in Medical School by Training Year and Gender*

		Training Year		Gender	
	Frequency N=181 (%)	Preclerkship N=107 (%)	Clerkship N=73 (%)	Male N=72 (%)	Female N=107 (%)
Alcohol abuse	15 (8.4)	9 (8.4)	6 (8.2)	10 (13.9)	5 (4.7)
Prescription drug abuse	5 (2.8)	2 (1.9)	3 (4.1)	15 (20.8)	9 (8.4)
Other drug abuse	4 (2.2)	4 (3.7)	0 (0.0)	2 (2.8)	2 (1.9)
An eating disorder	15 (8.4)	12 (11.2)	7 (9.6)	4 (5.6)	11 (10.3)
Anxiety	84 (46.7)	53 (49.5)	31 (42.5)	27 (37.5)	56 (52.3)
Depression	71 (39.4)	47 (43.9)	24 (32.9)	29 (40.3)	41 (38.3)
HIV (personal exposure)	4 (2.2)	4 (3.7)	0 (0.0)	3 (4.2)	1 (0.9)
HIV (training exposure)	38 (21.1)	26 (24.3)	12 (16.4)	11 (15.3)	27 (25.2)
Other serious infection (e.g. hepatitis, tuberculosis)	35 (19.5)	25 (23.4)	10 (13.7)	7 (9.7)	28 (26.2)
Marital/relationship problem	83 (46.1)	49 (45.8)	34 (46.6)	38 (52.8)	44 (41.1)

Table 11. *Frequency of Responses on Medical Student Perceptions of Health Concerns Affecting Academic Status by Training Year and Gender*

		Training Year		Gender	
	Frequency N=181 (%)	Preclerkship N=107 (%)	Clerkship N=73 (%)	Male N=72 (%)	Female N=107 (%)
Arthritis	13 (7.2)	9 (8.4)	4 (5.5)	6 (8.3)	7 (6.5)
Alcohol	148 (82.2)	88 (82.2)	60 (82.2)	54 (75.0)	93 (86.9)
Prescription drugs	153 (85.0)	90 (84.1)	63 (86.3)	57 (79.2)	95 (88.8)
Other drugs	152 (84.5)	89 (83.2)	63 (86.3)	56 (77.8)	95 (88.8)
An eating disorder	75 (41.7)	41 (38.3)	34 (46.6)	20 (27.8)	54 (50.5)
Diabetes	16 (8.9)	10 (9.3)	6 (8.2)	7 (9.7)	9 (8.4)
Anxiety	70 (38.9)	43 (40.2)	27 (37.0)	24 (33.3)	45 (42.1)
Depression	79 (43.9)	29 (27.1)	21 (28.8)	32 (44.4)	46 (43.0)
HIV (personal exposure)	124 (68.9)	75 (70.1)	47 (64.4)	42 (58.3)	81 (75.7)
HIV (training exposure)	102 (56.7)	61 (57.0)	41 (56.2)	35 (48.6)	66 (61.7)
Other serious infection (e.g. hepatitis, tuberculosis)	110 (61.2)	66 (61.7)	44 (60.3)	37 (51.4)	72 (67.3)
Peptic ulcer disease	13 (7.2)	9 (8.4)	4 (5.5)	5 (6.9)	8 (7.5)
Complicated pregnancy	48 (26.7)	27 (25.2)	25 (34.2)	12 (16.7)	35 (32.7)
Cancer	57 (31.6)	34 (31.8)	23 (31.5)	15 (20.8)	41 (38.3)
Marital/relationship problem	38 (21.1)	25 (23.4)	15 (20.5)	13 (18.1)	26 (24.3)

Table 12. *Frequencies on Student Responses to Proceed with Dual Role as Patient and Student in Four Hypothetical Scenarios*

Study vignettes	Accept the Role N (%)	Intermediate Solution N (%)	Avoid the Role N (%)
Prior role as student than patient role:			
1. Unmarried student, needs pregnancy test, discovers that clinic physician for that day directs her upcoming third-year OB/GYN rotation (high stigma)	59 (32.6)	66 (36.5)*	55 (30.4)
2. Student with severe gastrointestinal symptoms related to exam stress, discovers that clinic physician for that day directs his upcoming third-year family medicine rotation (low stigma)	99 (54.7)*	51 (28.2)	30 (16.6)
Prior role as patient than student role:			
3. Student with hypertension, good control, discovers personal physician is teaching attending on ward team (low stigma)	90 (49.7)*	68 (37.6)	22 (12.2)
4. Student with panic disorder, good control, discovers personal psychiatrist is teaching attending on ward team (high stigma)	40 (22.1)	61 (33.7)	79 (43.6)*

* Significant at $p < .05$

Table 13. *Frequencies on Student Responses to Report Impaired Colleague or Student in Three Hypothetical Scenarios*

Study vignettes	Report Impairment N (%)	Intermediate Solution N (%)	Avoid Reporting Impairment N (%)
1. Anatomy lab partner increasingly withdrawn, irritable, tearful, and self-critical experiencing suicidal ideation (high stigma-consequences)	39 (21.5)	97 (53.6)*	44 (24.3)
2. You are now an attending faculty physician. You have a third year student as a patient with significant alcohol and amphetamine abuse. Student extremely distressed, his performance is erratic (high stigma-consequences)	18 (9.9)	86 (47.5)*	76 (42.0)
3. You are an attending faculty physician. You have a third year student as a patient who has diabetes but is not monitoring his blood sugars adequately. Student is extremely distressed, his performance is erratic (low stigma-consequences)	19 (10.5)	97 (53.6)*	64 (35.4)

* Significant at $p < .05$

Appendix A: Information Letter

Information Letter (DRAFT)

I am addressing you in my role as student, not in my role as an employee with the Division of Community Health and Humanities, Faculty of Medicine, Memorial University of Newfoundland. I am currently completing my Master's in Community Health and would like to invite you to participate in a research study examining the prevalence of psychological distress, health care needs and practices, and barriers to mental health care among medical students. Your participation in the study is entirely voluntary and not part of your course requirements. You may withdraw from this study at any time and it will not affect your student status.

If you are interested in participating in this study, you will be asked to fill out a questionnaire which includes: a brief scale to assess psychological distress, a brief scale which assesses potential factors which contribute to distress, questions concerning health care needs and practices including vignettes which address attitudes to help-seeking, and questions to identify potential barriers to care. The survey is expected to take between 15 and 20 minutes to complete. If you do not wish to participate, you may leave the room at any time prior to administration of the survey, or if you do not wish to draw attention to your non-participation, you may remain in the room and pretend to complete the survey. In the additional comments section at the end of the survey, please indicate that you do not wish to participate and your survey will be destroyed.

Anonymity will be maintained throughout the course of the study. Your name will not be obtained, and as such will not appear on any questionnaires, or published in any reports. All forms will be stored in a locked filing cabinet in the Division of Community Health and Humanities for the duration of the study and kept for five years after. Only people directly involved with the research will have access to the questionnaires, and they will be asked to sign an undertaking of confidentiality.

Participation in the study and completion of the questionnaire will be considered consent to participate. Your participation tells us that you understand the information about the research study.

If you have any questions regarding this study, please do not hesitate to ask the researcher administering the study. If you have any concerns not addressed by the student researcher, please contact Dr. Ken Fowler, email: kenfowler@mun.ca in the Department of Psychology, Memorial University of Newfoundland or Dr. Natalie Beausoleil, email: nbeausol@mun.ca in the Division of Community Health, Memorial University of Newfoundland.

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If you feel any distress by inquiry into issues related to your mental health or feel you wish to talk to someone confidentially, you may contact the on-call counsellor at the University Counselling Centre (Ph: 864-8874). Students with urgent mental health concerns may access community-based mental health services when the University Counselling Centre is closed. A complete listing can be found on their site: (http://www.mun.ca/counselling/home/. If you would prefer to access services off-site, the *inConfidence* Employee and Family Assistance Program, is available to all medical students through the Newfoundland and Labrador Medical Association and is covered by Blue Cross. The number to call for assistance is 1-877-418-2181.

This research has been approved by the Provincial Health Research Ethics Board (HREB). If you have ethical concerns about the research that are not dealt with by the student researcher or supervisor, you may contact the ethics office, Health Research Ethics Authority at 709-777-6974 or by email at info@hrea.ca.

Sincerely,

Janet Bartlett
Master's Student Community Health
Ph: 777-6216
Email: jbartlet@mun.ca

Ken Fowler, Ph.SD
Department of Psychology
Ph: 864-4897
Email: kenfowler@mun.ca

Natalie Beausoleil, Ph.D.
Division of Community Health
Ph: 777-8483
Email: nbeausol@mun.ca

Appendix B: Script for In-Class Recruitment

Script In-Class Recruitment (DRAFT)

I am here today in my role as a Master's student, not in my role as an employee with the Division of Community Health and Humanities, Faculty of Medicine, Memorial University of Newfoundland and. I would like to invite you to participate in a research study examining the prevalence of psychological distress, health care needs and practices, and barriers to mental health care among medical students.

If you are interested in participating in this study, I will ask you to fill out a questionnaire shortly which includes: several brief scales which will assess psychological distress, potential factors which contribute to distress, and a series of questions concerning health care needs, practices and barriers to care, which include several vignettes that address attitudes to help-seeking. The survey is expected to take from 15-20 minutes to complete.

If you do not wish to participate, you may leave the room prior to administration of the survey, or if you do not wish to draw attention to your non-participation, you may remain in the room and pretend to complete the survey. In the additional comments section at the end of the survey, please indicate that you do not wish to participate and your survey will be destroyed.

Anonymity will be maintained throughout the course of the study. Your name will not be obtained, and as such will not appear on any questionnaires, or published in any reports. All surveys will be stored in a locked filing cabinet in the Division of Community Health and Humanities for the duration of the study. Only my co-supervisor in the Department of Psychology and I will have access to the questionnaires, and will both sign an undertaking of confidentiality.

Your participation in the study is entirely voluntary and not part of your course requirements. You may withdraw from this study at any time without any penalty to you. Participation in the study and completion of the questionnaire will be considered consent to participate.

If you have any questions prior to administration of the survey regarding this study, please feel free to ask me now. The information letter included with your survey will provide additional contact information if you have questions you feel I have not adequately addressed. As well, if you feel any distress by inquiry into issues related to your mental health or feel you wish to talk to someone confidentially, I have included some important contact information for confidential services on the enclosed information letter.

Thank you for your time and consideration.

Appendix C: Information Email

Information Email (DRAFT)

I am writing you today in my role as a Master's student with the Division of Community Health and Humanities, Faculty of Medicine, Memorial University of Newfoundland. I would like to invite you to participate in a research study examining the prevalence of psychological distress, health care needs and practices, and barriers to mental health care among medical students.

The survey includes several brief scales which will assess psychological distress, potential factors which contribute to distress, and a series of questions pertaining to health care needs and practices. It will also include vignettes which address attitudes to help-seeking, and questions to identify potential barriers to care. If you are interested in participating in this study, please click on the following link: www.fluidsurvey.com which will connect you to a website where you may complete the survey anonymously. The survey will take approximately 15-20 minutes to complete. It is anonymous, confidential and voluntary. Participation in the study and completion of the questionnaire will be considered consent to participate.

If you feel any distress by inquiry into issues related to your mental health or feel you wish to talk to someone confidentially, you may contact the on-call counsellor at the University Counselling Centre (Ph: 864-8874). Students with urgent mental health concerns may access community-based mental health services if the University Counselling Centre is closed. A complete listing can be found on their site: (http://www.mun.ca/counselling/home/. If you would prefer to access services off-site, the *inConfidence* Employee and Family Assistance Program, is available to all medical students through the Newfoundland and Labrador Medical Association and is covered by Blue Cross. The number to call for assistance is 1-877-418-2181.

This research has been approved by the Health Research Ethics Authority. If you have ethical concerns about the research that are not dealt with by the student researcher or supervisor, you may contact the Chairperson of the Health Research Committee on Ethics in Human Research. If you have any additional questions regarding this study, please do not hesitate to ask the researcher administering the study. If you have any concerns not addressed by the student researcher, please contact Dr. Ken Fowler, email: kenfowler@mun.ca in the Department of Psychology, Memorial University of Newfoundland or Dr. Natalie Beausoleil, email: nbeausol@mun.ca in the Division of Community Health, Memorial University of Newfoundland.

Thank you for your time and consideration.

Sincerely,

Janet Bartlett
Master's Student Community Health
Ph: 777-6216; Email: jbartlet@mun.ca

Appendix D: Human Investigations Committee Approval

Health Research Ethics Authority

Ethics Office
Suite 200, Eastern Trust Building
95 Bonaventure Avenue
St. John's, NL AlB2XS

February 21, 2014

Ms. Janet Bartlett
Division of Community Health
Faculty of Medicine, Health Sciences Centre

Dear Ms Bartlett Reference #14 036

RE: Medical Student Distress, Personal Health Care Practices and Barriers to Care

At the meeting held on February 20, 2014, the Health Research Ethics Board has reviewed your application and granted full board approval as submitted.

Full board approval of this research study is granted for one year effective February 20, 2014.

The committee requires that the information will only be presented in aggregated form and that no descriptor profiles be presented.

This approval will lapse on February 20, 2015. It is your responsibility to ensure that the Ethics Renewal form is forwarded to the HREB office prior to the renewal date; you may not receive a reminder, therefore the ultimate responsibility is with you as the Principle Investigator. *The information provided in this form must be current to the time of submission and submitted to the HREB not less than 30 nor more than 45 days of the anniversary of your approval date.* The Ethics Renewal form can be downloaded from the HIC website http://www.hrea.ca

The health Research Ethics Board advises THAT IF YOU DO NOT return the completed Ethics Renewal form prior to date of renewal:

- *Your ethics approval will/apse*
- *You will be required to stop research activity immediately*
- *You may not be permitted to restart the study until you reapply for and receive approval to undertake the study again*

email: info@hrea.ca Phone: 777-8949 FAX: 777-8776

Lapse in ethics approval may result in interruption or termination of funding

It is your responsibility to seek the necessary approval from the Regional Health Authority or other organization as appropriate.

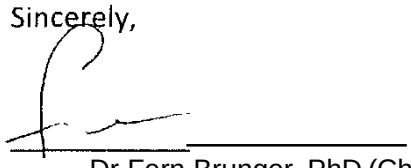
Modifications of the protocol/consent are not permitted without prior approval from the Health Research Ethics Boards. Implementing changes in the protocol/consent without HREB approval may result in the approval of your research study being revoked, necessitating cessation of all related research activity. Request for modification to the protocol/consent must be outlined on an amendment form (available on the HREA website) and submitted to the HREB for review.

This research ethics board (the HREB) has reviewed and approved the research protocol and documentation as noted above for the study which is to be conducted by you as the qualified investigator named above at the specified site. This approval and the views of this Research Ethics Board have been documented in writing. In addition, please be advised that the Health Research Ethics Board currently operates according to *Tri-Council Policy Statement: Ethical Conduct for Research Involving Humans; ICH Guidance E6: Good Clinical Practice* and applicable laws and regulations. The membership of this research ethics board is constituted in compliance with the membership requirements for research ethics boards as defined by *Health Canada Food and Drug Regulations Division 5; Part C.*

Notwithstanding the approval of the HREB, the primary responsibility for the ethical conduct of the investigation remains with you.

We wish you every success with your study.

Sincerely,



Dr Fern Brunger, PhD (Chair Non-Clinical Trials}
Ms. Patricia Grainger, (Vice-Chair Non-Clinical Trials} Health Research Ethics Board

Appendix E: Measures used in the study

Medical Student Stress Survey

We are interested in learning about the health care concerns experienced by medical students at this university. Results of this survey will be used to understand issues surrounding medical student health care and to improve the health care options of medical students nationally. No effort will be made to identify the responses of individual study participants; medical student privacy will be respected absolutely. Participation in this study is entirely voluntary.

Section 1: Demographics

These questions will be used to help understand the experience of different subgroups within the medical student community. You are free, however, to choose not to answer any questions if you wish.

1. Age: ≤24 ◯ 25-29 ◯ 30-34 ◯ 35-39 ◯ 40-44 ◯ 45+ ◯

2. Sex: Male ◯ Female ◯

3. Marital Status: Single ◯ Married ◯ Divorced/Separated ◯ Widowed ◯

4. Do you have children? Yes ◯ No ◯

5. Place of upbringing: Rural ◯ Urban ◯

6. Please circle which category best describes your current level of study within the medical school?

Year in medical school: 1 2 3 4 Other (specify): _____

Section 2. Kessler Psychological Distress Scale (K10): Measure of global psychological distress.

For each item below, indicate your level of agreement by circling the corresponding number:

	None of the time (score 1)	A little of the time (score 2)	Some of the time (score 3)	Most of the time (score 4)	All of the time (score 5)
1. In the past 4 weeks, about how often did you feel tired out for no good reason?	1	2	3	4	5
2. In the past 4 weeks, about how often did you feel nervous?	1	2	3	4	5
3. In the past 4 weeks, about how often did you feel so nervous that nothing could calm you down?	1	2	3	4	5
4. In the past 4 weeks, about how often did you feel hopeless?	1	2	3	4	5
5. In the past 4 weeks, about how often did you feel restless or fidgety?	1	2	3	4	5
6. In the past 4 weeks, about how often did you feel so restless you could not sit still?	1	2	3	4	5
7. In the past 4 weeks, about how often did you feel depressed?	1	2	3	4	5
8. In the past 4 weeks, about how often did you feel that everything was an effort?	1	2	3	4	5
9. In the past 4 weeks, about how often did you feel so sad that nothing could cheer you up?	1	2	3	4	5
10. In the past 4 weeks, about how often did you feel worthless?	1	2	3	4	5

Section 3. Perceived Medical School Stress Scale (PMSS): Measure of perceived medical school stressors. *For each item below, indicate your level of agreement by circling the corresponding number:*

	Strongly Disagree (score 0)	Disagree (score 1)	Neither Agree or Disagree (score 2)	Agree (score 3)	Strongly Agree (score 4)
1. Medical school fosters a sense of anonymity and feelings of isolation among the students	0	1	2	3	4
2. I am concerned that I will not be able to endure the long hours and responsibilities associated with clinical training and practice	0	1	2	3	4
3. I do not know what the faculty/administration expect of me	0	1	2	3	4
4. Medical training controls my life and leaves too little time for other activities	0	1	2	3	4
5. I am concerned that I will unable to master the entire pool of medical knowledge	0	1	2	3	4
6. This medical school is fostering a physician role at the expense of one's personality and interests	0	1	2	3	4
7. Medical school is more competitive than I expected	0	1	2	3	4
8. The attitude of too many of the faculty is that students should be subjected to 'baptism of fire'	0	1	2	3	4
9. The majority of students feel that success in medical school is in spite of the administration rather than because of it	0	1	2	3	4
10. Medical school is cold, impersonal and needlessly bureaucratic	0	1	2	3	4
11. Medical school is more of a threat than a challenge	0	1	2	3	4
12. Personal finances are a source of concern to me	0	1	2	3	4
13. Accommodation is a source of concern to me	0	1	2	3	4